ENVIRONMENTAL ASSESSMENT

Scoggins Creek Density Management, Wildlife Habitat Enhancement and Watershed Restoration Project

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USDI Bureau of Land Management
Oregon State Office
Salem District
Tillamook Resource Area
Washington County, Oregon

Responsible Agency:	USDI Bureau of Land Management
Responsible Official:	Dana Shuford, Field Manager Tillamook Resource Area 4610 3rd Street Tillamook, OR 97141 (503) 815-1100
For further information, contact:	Carolina Hooper, Team Leader Tillamook Resource Area 4610 3rd Street Tillamook, OR 97141 (503) 815-1119

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CHAPTER 1.0 PROJECT SCOPE

For the reader's convenience, terms defined in the Glossary are shown in ***bold italics*** the first time they appear within the text of this ***environmental assessment*** (EA).

1.1 Project Location

The project area is located in Township 1 south, Range 5 west, sections 1, 3, 5, 8, 9 and 15. These sections are located 9 miles east of the town of Forest Grove. The majority of the project area is within the east fork and the main fork of Sain creek drainage which feeds into Henry Hagg lake. The northwest corner of section 5 and section 8 flow into the upper stretches of Lee Creek drainage (Figure 1).

The project is on ***O&C lands (Oregon and California Railroad Land)*** and in the ***Adaptive Management Area (AMA)*** and ***Riparian Reserve (RR)*** land-use allocation as identified in the *Salem District Record of Decision and Resource Management Plan (1995).* This document is referred to as the ***RMP***. The objectives of the AMA are to develop and test new management approaches to integrate and achieve ecological and economic health. AMAs are intended to restore and maintain late-successional habitat, as well as provide a stable timber supply (RMP, page 19). RR are portions of watersheds where riparian-dependant resources receive primary emphasis. Activities within RR should not prevent or retard the attainment of ***Aquatic Conservation Strategy*** (***ACS***) Objectives. The Late-Successional Reserve Assessment (LSRA) for Oregon's Northern Coast Range Adaptive Management Area identified the area as part of the Buffer/Early Seral landscape cell and zone. The buffer landscape zone is intended to provide refugia for late-seral species in parts of the assessment area that will probably continue to be dominated by early and mid-seral stands. The project area has been analyzed on a watershed level in the *Upper Tualatin-Scoggins Watershed Analysis* (USDI, Bureau of Land Management 2000).

The project is not located within designated critical habitat for the marbled murrelet or Northern spotted owl nor is it within a key watershed. The project is in the municipal watershed for the community of Forest Grove.

1.2 Background

During the summer of 1999, an ***interdisciplinary team*** (***IDT***) from the Tillamook Field Office**,** analyzed the Scoggins Creek fifth field watershed, to identify activities that were "ripe" for decision. These were considered to be projects that could be implemented in the next 3 to 5 years. This planning process resulted in a variety of projects that included forest stand management, wildlife habitat enhancement, and watershed restoration. In November of 1999, the

Tillamook Field Manager selected from the list of possible management activities those actions, hereafter called the proposed action, described in section 2.3. The forthcoming ***EA*** will be analyzing these projects. This EA is intended to provide the Tillamook Field Manager sufficient information for reaching an informed decision and determining whether an action may have significant environmental effects. Should the selected actions(s) have significant environmental effects, an ***Environmental Impact Statement*** will be prepared. If the selected action(s) do not have significant environmental effects, a ***Finding of No Significant Impact*** will be prepared.

1.3 Purpose of and Need for Action

1.3.1 Density Management in the Adaptive Management Area and in Riparian Reserves

Adaptive Management Area

All of the stands included in the proposed density management project were most likely part of the 1945 Tillamook Burn. This fire was followed by salvage logging operations, of which snag falling was a common component to reduce future fire hazard. Within the late 1950 and 1960's the BLM stands were probably hand planted. The end result of the fires, the logging, and the planting was a mosaic of young forest stands, that contained isolated pockets of older trees. In the absence of an overstory canopy, the younger trees grew rapidly with very close spacing. Today the average age of the stands are 49 years old, and the average tree diameters range from 9.8 to 16.1 inches. While the trees are still fundamentally healthy, their roots systems and crowns tend to be poorly developed. This makes them susceptible to being blown over in large wind storms, or being infected by root pathogens such as laminated root rot. Within the last ten years, the high tree density has notably reduced the growth rate of the trees and ultimate development of the desired late-successional forest character. Without intervention at this time, the development of many late-successional forest structural features would occur at a much slower rate, because the overstory is becoming increasingly dense and uniform.

The purpose of the density management thinning treatments within the AMA are to accelerate the development of some late-successional forest structural features, including large trees, gaps in the canopy, snags and down logs, various levels of overstory tree densities, and various levels of understory development. Implementation of the density management treatments will enhance the overall level of diversity in this area. It will also supply timber to local mills.

The watershed analysis recommends evaluating stands in the AMA and RR land-use allocations to consider application of silvicultural treatments designed to enhance the development of late-seral habitat. Potentially beneficial treatments identified in the watershed analysis include (1) application of density management thinning to well-stocked and overstocked mid-aged conifer stands inside and outside of Riparian Reserves to encourage faster tree growth and increase windfirmness of the remaining conifers, (2) enhance the development of late-seral habitat through the application of variable-density thinning, (3) creation of snags, and (4) underplanting with

conifers in areas where they are in short supply (ppgs. 164-170).

Riparian Reserves

RR are a land-use allocation that include an area which is one site-potential tree height on each side of streams that do *not* contain fish; and two site-potential tree heights in width on each side of fish-bearing streams and water bodies. The stands in the RR are growing in very dense conditions for the same reasons described for those stands in the adjacent AMA. The growth rates (especially diameter growth rates) of Douglas-fir trees within these densely stocked stands generally are slower, the length of the live crowns are shorter, and the length and diameter of the limbs are smaller than those growing under less crowded conditions. The understory development in these dense stands is also less. Continued understory development, however, will be further limited as the overstory density increases. Therefore, progress toward late-seral forest conditions would be slow. Snag recruitment within densely stocked stands is primarily a result of suppression mortality, with snags generally being recruited from the smaller trees within the stand. In general, there is very little, if any conifer regeneration in the understory. The few conifers which exist in the understory of some stands can be expected to decline in vigor and exhibit a very slow growth rate or die because they are no longer able to survive under the increasingly dense overstory shade

Density management in the RR (outside of the streamside "no-treatment" buffers) is proposed for the following reasons: maintain or increase the growth rates, vigor and crown development of many of the reserve (residual) trees, thus speeding up the general process of developing larger trees for eventual recruitment as large wood into the riparian area and potentially into the stream itself; provide improved growing conditions for any conifer regeneration present in the understory, and the development or stimulation of vigorous shrub and herbaceous understory vegetation; increase the wind-firmness of the reserve trees; add to the long-term diversity of stand characteristics throughout the RR and across the general project area; increase the level of structural complexity within the RR; and be consistent with the objectives of the ACS.

1.3.2 Watershed Restoration and Road Management

Salvage operations which were done throughout the 1900's have left a legacy of roads and compacted soil surfaces in the project area. On the broad ridgetops throughout the project area it is estimated that up to 25% of the area is compacted (see chapter 3.2). The *Upper Tualatin-Scoggins Watershed Analysis* identifies the existence of many discontinued roads known as legacy roads (p. 99). These roads can potentially pose an erosion hazard if they are deeply cut into the ground, have little vegetation and tend to channel run-off, leading to erosion and gullies. The main management concern for the soils in this area is their sensitivity to compaction and their risk to erosion due to their high portion of silt and low gravel contents.

Another component of watershed restoration, the restoration of large conifers within the RR, is addressed in section 1.3.1. and 1.3.3.

The Upper Tualatin-Scoggins Watershed Analysis contains a number of recommendations that are associated with watershed restoration (see pages 164-170). A partial list of these recommendations includes: to close and stabilize roads that are no longer needed for resource management; upgrading and using legacy roads rather than constructing new roads; the road construction, upgrading, maintenance, and closure should be performed in accordance with the Best Management Practices, as listed in Appendix C of the RMP; rocked roads in particular should be considered for subsoiling; in prioritizing roads for treatment (i.e. close and stabilize, upgrade, maintain), considerations should include those roads that are located in drainages where the average relief is greater than 30 percent; located in a valley bottom or mid-slope position on the landscape; have an inordinate number of stream crossings; have a history of failure; and have extensive lengths of cut and fill.

1.3.3 Wildlife Habitat Enhancement

Because of the stand history described in section 1.3.1, there are a number of stands in the project area that are lacking in essential components of late-successional habitat. These stands vary in age from 40 to 120 years old, and are all areas that will not be treated with Density Management thinning. Some of the younger stands have very dense tree canopies, which has resulted in small, uniform crowns. In some riparian areas, conifers are either under-represented or are experiencing extremely slow growth beneath a hardwood understory. Some older and younger stands are lacking in both standing and down CWD. In some older stands there is a lack of structural diversity and features such as large limbs and forked tops that would be used for nesting and roosting.

In younger stands and in riparian areas, wildlife habitat enhancement is proposed because it will provide for a more diverse forest canopy, and allow for the faster development of individual selected conifers. These trees will provide for more structural diversity in the short term and provide for a source or larger CWD in the future. In older stands, the girdling of individual trees and the creation of snag will allow the stand to more quickly develop those features that are desirable to wildlife.

The watershed analysis recommends: reestablishing conifers in riparian areas; develop late-successional characteristics including stand complexity, snags and down wood; retain and protect from disturbance existing snags and coarse woody debris; when planning density management thinnings, evaluate adjacent areas that are not being considered for silvicultural treatment, for snag or CWD creation projects. Stands with lower stocking that won't be treated with density management thinning, RR or ***Timber Production Capability Classification (TPCC)*** withdrawn areas would all be good candidates for evaluation; where a few scattered understory conifers are growing within riparian areas that are strongly dominated by alder, consider treatments to increase understory and overstory conifer growth, vigor and exposure to sunlight. (ppgs 64-70)

1.3.4. Project Objectives

By comparing existing resource conditions to desired resource conditions and the management objectives contained in the Upper Scoggins-Tualatin Watershed Analysis, RMP, and the LSRA, the IDT identified several management opportunities. The following objectives were developed to address those opportunities:

a. Accelerate the development of some late-successional forest habitat characteristics: such as a diverse canopy structure, and large trees. Some of the larger diameter trees resulting from this action could become sources of high quality large snags and down wood in the future.

b. Enhance wildlife habitat in areas that already have some late-successional forest habitat characteristics, or in areas where wildlife habitat is lacking and density management is not proposed. This would be primarily done through the creation of snags, down wood and individual tree release.

c. Reduce road density and existing levels of compaction by removing roads that are no longer needed. Reduce existing compaction levels when possible.

d. Retain existing desirable habitat features to the greatest extent possible.

e. Provide social and economic benefits to local communities.

f. Actions will lead to improved watershed conditions in the long term, to meet the intent of the ***ACS*** objectives.

1.4 Decision to be Made

Dana Shuford, Tillamook Field Manager, is the official responsible for deciding whether or not to prepare an environmental impact statement, and whether to approve the density management thinning, the wildlife habitat enhancement projects, and the watershed restoration projects as proposed, not at all, or to some other extent. More than one decision may result from this environmental analysis.

1.5 Issues and Units of Measure

In compliance with NEPA, the proposed action was listed in the June, September and December 2000 and March 2001 edition of the quarterly *Salem District Project Update* which were mailed to over 1,000 addresses, as well as a letter mailed on October 5, 2000 to 120 potentially affected and/or interested individuals, groups, and agencies (Project Record, Document 27 and 28). A presentation was also given to the Tualatin Watershed Council meeting on November 7, 2000, which was attended by nineteen people (Project Record, Document 36) A total of two letters were received as a result of this ***scoping*** (Project Record, Documents 32, 35). Two additional project non-specific letters were received on 3/28/00 and 7/11/00 (Project Record, Document 10 and 20) which referenced a number of questions located at an e-mail address. All public input

was assigned a number and filed in the Project Record. The IDT reviewed, clarified, and assessed the public comments. The disposition of those comments are contained in Appendix 1 and Appendix 10.

Considering public comment, the IDT identified one ***major issue*****,** associated with the density management project. The IDT did not identify any major issue for the Wildlife Habitat Enhancement Project or the Watershed Restoration project. The identified major issue relates to soils**,** and will be the focus of this environmental analysis. Chapter 3 will also contain a discussion of the four other elements of the environment (i.e, water, vegetation, wildlife, and fisheries) which were not identified as major issues but are subject to environmental analysis. A brief economic analysis is also included. Additionally, the major issue, and the other elements of the environment are associated with a specific ***unit of measure.*** The units of measure were selected to evaluate issue resolution (i.e, soil issue), evaluate attainment of project objectives, and/or describe environmental impacts.

1.5.1 Soil

Major Issue Statement: The use of ground-based equipment and the construction of new and permanent roads would result in soil disturbance, soil compaction, erosion and a loss of soil productivity.

The units of measure selected include: acres of soil compaction, acres of soil disturbance, and a narrative of the effects of an action on soil productivity.

1.5.2 Water

The units of measure selected include water quality, and basin hydrology including stream flow and channel condition.

1.5.3 Vegetation

Vegetation resources have been divided into three categories to facilitate analysis. These categories include special status/special attention species, noxious weeds, and forest vegetation (within AMA and RR land use allocations). The units of measure selected are a narrative and/or acres treated.

1.5.4 Wildlife

Wildlife has been divided into four categories to facilitate analysis. The first category is those species listed under the ***Endangered Species Act (ESA)***. For each species there will be a narrative discussion describing the expected impacts as it relates to the potential for disturbance; impacts to suitable habitat; and in the case of the spotted owl, impacts to dispersal habitat. For each ESA listed species there will be an narrative that described whether there would be: 1 / no effect; 2/ may

affect, not likely to adversely affect; or 3/ may affect, likely to adversely affect. The second category of ***Survey and Manage (S&M)*** mollusks will be measured with a narrative that describes the maintenance and enhancement of the species at the site. The third category of Red Tree Voles will be measured with a narrative that describes the protection of the physical integrity of the nest site to maintain its population and provide for expansion of the number of active nests at the site. The fourth category of Bureau 6840 Special Status Species Policy will be evaluated with a narrative that describes whether the action elevates their status to any higher level of concern including the need to list under ESA.

1.5.5 Fisheries

To facilitate analysis the fisheries resources have been divided into three categories (i.e, fish species listed or proposed under ESA, designated Critical Habitat for fish species listed under the ESA, and BLM Manual 6840 policy species. The unit of measure selected for each fish species listed or proposed under the ESA is a narrative that describes whether there would be: 1/ no effect; 2/ may affect, not likely to adversely affect; or 3/ may affect, likely to adversely affect. The unit of measure selected for designated Critical Habitat for fish species listed under the ESA is a narrative that describes whether there would be: 1/ no effect; 2/ may affect, not likely to adversely affect; or 3/ may affect, likely to adversely affect. The unit of measure selected for the BLM Manual 6840 policy fish species is a narrative that describes whether an action would result in a trend toward federal listing or loss of population viability. An additional unit of measure for the fisheries resources is whether an action is consistent with ACS objectives.

CHAPTER 2.0 ALTERNATIVES

2.1 Alternative Development

In addition to the required "no action" alternative, the IDT developed Alternative 3 which responds directly to the major issue (soils). During the development of Alternative 3, the IDT developed four criteria. The criteria which were either incorporated into Alternative 3 or dropped from detailed study for the reasons cited in section 2.2. Therefore, the finalized list of alternatives to the Proposed Action includes a "no action" alternative and one action alternative, that addresses the major issue and fulfills the purpose and need for action detailed in section 1.3.

2.2 Alternatives Dropped From Detailed Study

In an attempt to resolve the major issue (section 1.5.1) the IDT began to formulate possible alternatives. Potential methods to resolve the issue included:

1. Decompact and/or add organic matter to additional roads or skid trails. This option was explored at length, but it was decided that we had already identified the best roads to decompact. Those roads that remained, were built so long ago that they are already growing back with trees and vegetation, and decomissioning them would cause more environmental damage than it would solve.

2. Limit or reduce the amount of ground-based logging. This option was explored at length, and eventually resulted in the development of Alternative 3. We also considered an all-cable logging option. However, this was dismissed based upon the fact that we would still have to build substantial amounts of road, and the area that is suitable for cable-logging is limited to those areas already identified. The impacts to soils would have been similar to the proposed action, because of the amount of road that would still have to be built. In addition, this would greatly reduce the amount of density management that would occur, thus not being responsive to the purpose and need for action.

3. Limit or avoid building new or permanent roads. This option was explored at length and eventually resulted was incorporated in the development of both Alternative 2 and 3. No new permanent roads will be built in either alternative.

4. Limit or avoid working during periods of inclement weather. Heavy rainfall (more than 1 inch of rain in 24 hours), can effect the major issue in several ways. Heavy equipment in the woods during times of heavy rainfall can cause worse or additional compaction, or can cause increased erosion. Hauling during heavy rainfall can also increase sediment flow to streams. The IDT felt that limiting heavy equipment in the woods during times of heavy rainfall, would do the most to resolve the major issue, and that potential sediment flow to streams during hauling can be mitigated effectively with straw or other barriers. Alternative 3 was developed with the intention

of decreasing the impact of heavy equipment in the woods during all weather conditions.

2.3 Alternatives Considered in Detail

2.3.1. Alternative Description

2.3.1.1. Alternative 1 (No Action)

The BLM would not implement the watershed restoration, wildlife habitat enhancement or density management thinning projects at this time. The local plant and animal communities would be dependent on and respond to ecological processes that would continue to occur based on their existing condition.

This alternative serves to set the environmental baseline for comparing effects of the two action alternatives.

2.3.1.2. Elements Common to Alternatives 2 and 3

The following mitigation measures and design features are common to Alternatives 2 and 3. Both of these alternatives would be implemented using the ***Best Management Practices***, ***(BMPs)*** as described in Appendix C of the RMP. The BLM utilizes the best available information and research from institutions and universities throughout the Pacific Northwest in developing BMPs for forest management practices to protect water quality and soil productivity or mitigate adverse impacts while meeting other resource objectives. The specific design features of this project would help meet the management objectives contained within the RMP and are in compliance with the standards and guidelines contained within the Northwest Forest Plan.

Specific Design features:

<u>Density Management Thinning</u>

- Thin the stands in a variable-spaced manner to the recommended *basal area* levels shown in table TR-1 (Appendix 2). Select only the Douglas-fir component for removal and retain the other conifers and hardwoods in preference to Douglas-fir.

- The Density Management treatment would not occur sooner than May 2002.

- Do *not* select trees greater than or equal to 20 inches ***diameter at breast height (dbh)*** for removal, *regardless* of the basal area level in a particular area. It is recognized that occasional larger-diameter trees may have to be cut to create skyline corridors, skid roads, or landing areas, but reasonable effort should be made to maintain these trees in the

stands.

- Generally, a minimum 50 feet "no-cut" buffer would occur along both sides of non-fish bearing streams and a minimum 100 foot "no-cut" buffer along both sides of fish- bearing streams and wetlands less than one acre. If there are steep inner gorges present, these can be used to define "no-cut" buffers as long as the minimum widths are maintained.

- Reserve all hardwood trees.

- Retain existing western hemlock, western red cedar, and grand fir advance regeneration.

- Protect and retain to the greatest extent possible green trees with characteristics desirable to wildlife (broken or forked tops, hollow cavities, large limbs).

- Well-defined root disease pockets more than ¼-acre (generally those exceeding ½-acre) may be reforested with disease-tolerant conifers such as western red cedar, or hardwoods such as bigleaf maple (all hardwoods are immune to *P. weirii* root rot).

- To prepare reforestation sites for planting, slash all brush to a 6-inch stump height, and lop and scatter slash less than 6 inches in diameter at the small end so that the slash depth is one foot or less. Root disease centers would *not* be treated within Riparian Reserves.

- Planted trees may be tubed for animal damage.

- To take advantage of the more open stand conditions created where cable yarding corridors converge near the landings, the area within a 100-foot radius downhill of the landings would be planted with shade-tolerant conifer seedlings such as western red cedar, grand fir, and/or western hemlock.

- All natural surface roads will be seeded with a native seed. Additional soil stabilization work consisting of seeding may be required at the option of the Authorized Officer. If determined to be appropriate, subsoiled roads can be planted with red alder seedlings (1-0 bare root or one-year-old containerized planting stock) to supplement natural alder regeneration.

Fire and Smoke Management Design Features

- Any prescribed burning of slash at roads and landings would adhere to smoke management/air quality standards.

- All burning will be conducted in compliance with the Oregon Sate Implementation Plan Oregon Smoke Management Plan as administered by the Oregon Department of Forestry.

- Landings piles should be located as far as possible from green trees to minimize damage.

- Hand piles will be covered to facilitate the consumption of fuels during the high moisture fall/winter burning periods.

- Lopping and scattering of fuels may be incorporated in areas where fuel loading is relatively heavy but not heavy enough to warrant hand piling or burning.

AMA Learning Objectives

- Implement the *AMA learning objectives* that are described in Chapter 5.

Coarse woody debris (down wood and snags):.

- Retain existing coarse woody debris to the extent possible (includes down wood and snags).

- Any snags that are cut or are knocked over during logging would be left on site for coarse wood enhancement.

- A combination of Coarse woody debris strategies # 2 and 3 outlined in the LSRA will be employed, focusing on maintaining live tree stocking levels which result in growing larger trees rapidly. Create 2 snags (or snag-topped living trees) and 1 down log per acre from average or larger-sized leave trees in the low-density patches in unit 9-1, and 2 snags (or snag-topped living trees) per acre from average or larger-sized leave trees in unit 3-2.

- If larger trees, generally 18 inches dbh or more, are felled to create cable corridors, the first two will be retained, on site for coarse wood enhancement.

- Retain reserve trees marked within Right-of-way of Road 3.3 on site for coarse wood enhancement.

- In the near-term and in future supplementation of existing down wood levels, to reduce the probability of Douglas-fir beetle-related mortality in the residual stands: (1) do not add more than three fresh Douglas-fir logs per acre greater than 12 inches in diameter in a three-year period and (2) fell trees between July and the end of September.

- Surround existing large snags (greater than 18"dbh) or other snags being actively used by wildlife with two or more leave trees to protect them from logging damage.

- Reserve two to three larger-diameter Douglas-fir trees spaced eight (8) feet or less apart at the rate of approximately *four* such “groups” per acre where they occur. At a future date, one of these trees could potentially be converted into a snag, thus creating a "protected"

snag for use by wildlife.

Logging and Hauling Design Features

- Generally, all logs would be fully suspended over streams and for 25 feet on either side over the adjacent banks.

- The county road, known as Sain Creek Road which accesses section 3, would only be used for log hauling during periods of low soil moisture.

- Hauling would cease during periods of extremely wet weather or when road activities result in a visible increase in turbidity in any drainage facility or road surface that drains into a watercourse, and can not be easily abated, as determined by the Authorized Officer.

- Log lengths would be limited to 40 feet plus trim to reduce damage to the reserved trees during yarding operations. If determined necessary by the AO, log lengths would be reduced on specific corridors to achieve full-suspension over water courses.

- Waste hazardous material would be handled in accordance with Section 25, 26, and 27 of the timber sale contract (BLM Form 5450-3). In summary, these sections address watershed protection including water quality, erosion control and soil damage; refuse control and disposition of waste materials; and the proper storage and handling of hazardous materials.

- In order to provide for needed legal and physical access for long-term management, including timber removal from the proposed Scoggins Creek project area, it will be necessary to acquire appropriate legal rights by either amending existing O&C Reciprocal Right-of-Way and Road Use Agreement (R.W.A. S-905) or securing an easement from the non-Federal landowner tributary to the subject BLM parcels over existing roads and new construction.

- Proposed haul routes are shown in Figure 4.

To Protect Survey and Manage and other Sensitive Species

- No potentially suitable murrelet nest trees will be felled as a part of the Scoggins Creek project and where possible, no openings would be created within one tree length surrounding a potential murrelet nest tree.

- Any newly discovered (as per the Pacific Seabird Group Marbled Murrelet Technical Committee protocol) Marbled Murrelet sites will be protected by a 0.5 mile radius buffer on all contiguous existing and recruitment federal habitat.

- Lichen surveys for *Pseudosyphellaria rainerensis* will be completed in conjunction with tree selection, specifically on trees that will be felled in the wildlife enhancement project areas,. Bryophyte, vascular plant and noxious weed surveys are not required in the wildlife enhancement areas of the project.

- Prior to entering the sale area each work season, or before returning to the watershed after leaving it, any heavy machinery (with the exception of log trucks and pick-up trucks used for daily personnel travel) would have all dirt and adhering vegetation cleaned from it to prevent the spread of noxious and/or invasive weeds.

- Unit W1-1, trees would be selected and felled in such a way as to avoid impacting existing decay class 3, 4, and 5 down woody debris which is greater than 15 inches in diameter plus a Qualified field botanist, a Wildlife Biologist, or trained staff would be involved in selecting all trees to be felled or girdled.

- A no disturbance buffer will be placed around the *Buxbaumia viridis* site in unit 3-1 and all *Peltigera pacifica* sites. No trees shall be felled into or dragged through any no disturbance buffer zone.

Watershed Restoration and Road Work

The BLM proposes to do a variety of road building, road restoring and road decomissioning through out the project area. Roads that are reconstructed are generally those that exist from the previous salvage logging operations, are easily discernible on the ground, and are still compacted. New roads and all road reconstruction would be temporary, natural surfaced road, which would be decomissioned using a subsoiler for hydrologic reasons after the project completion. Decomissioning could include, but is not limited to decompacting with a subsoiler, removing of culverts, and adding organic matter.

- New temporary roads would be located outside of Riparian Reserves.

- All activities associated with road construction, reconstruction, decomissioning and culvert removal would be done during periods of low soil moisture as determined by the Authorized officer.

Wildlife Habitat Enhancement

The BLM proposes to do wildlife habitat enhancement throughout the project area in sections 1, 3, 5, 8, and 9. In general, this work would be done in older forest stands, or riparian areas that will not be treated with density management, or in younger forest stands that are not suitable for density management. Snags would be created through girdling or by inoculation with heart rot. Individual conifers would be released from competition by girdling adjacent trees. In some cases, a small patch would be created around the release tree to add structural diversity and down wood

to the stand. Descriptions of enhancement projects that are proposed to be implemented in specific units can be found in **APPENDIX 7**.

All of the wildlife habitat enhancement treatments, including the portions within areas identified as helping to meet the 15% Retention Standard and Guideline, have been designed to promote the development of late-seral habitat, or to enhance the current quality of late-seral habitat by promoting the development of certain important habitat features. Implementation of the habitat enhancement projects would help better achieve the objectives of the 15% S&G, as well as AMA and RR land allocations.

- With the exception of unit W1-1, all of the projects which result in the generation of noise above the ambient level would be implemented between July 8 and February 28.

- Within unit W1-1, work which results in the generation of noise above the ambient level or requires climbing more than 25 feet into the canopy, would be implemented between August 6 and February 28. Between August 6 and September 15, daily time restrictions would apply to work conducted in unit W1-1. Daily time restrictions would confine work to the period of time between two hours after sunrise and two hours before sunset.

- No tree which appears potentially suitable as a nest tree for the spotted owl or marbled murrelet, or contains a suspected nest of any other bird or mammal would be cut, nor would any tree adjacent to a potentially suitable spotted owl or marbled murrelet nest tree or any tree containing a suspected nest of a bird or mammal.

2.3.1.3. Alternative 2 (Proposed Action)

The location of the work described in Alternative 2 is found on Figure 2.

1. Density Management in the Adaptive Management Area (AMA) and in Riparian Reserves (RR)

Density management would occur using both cable logging and ground-based logging. And would cover approximately 526 acres. Approximately 262 acres would be ground-based logging and 264 acres would be done using a cable logging system. In general, the ground based areas will have slopes of 35% or less, and the cable logging areas will have slopes ranging from 35-70%. Of the 526 acres proposed for density management, 152 of these acres would be in RR, approximately 128 of these acres would be accomplished using a cable logging system, and the remaining 21 acres would have the logs winched out to existing roads or to locations outside of the RR. It is anticipated that this alternative would generate approximately 6.86 mmbf of Douglas-fir timber.

Table 1. Scoggins Creek Project - Alternative 2
Summary of the Proposed Density Management Treatment Units
by Yarding System, Land Allocation and Acreage

Unit Number	Yarding System	Land Allocation	Acres
3-1	Cable	AMA	20
3-1	Cable	R.R.	14
Unit Total			34
3-2	Cable	AMA	47
3-2	Cable	R.R.	64
3-2	Ground	AMA	37
3-2	Ground	R.R.	6
Unit Total			154
3-3	Ground	AMA	11
3-3	Ground	R.R.	3
Unit Total			14
5-1	Cable	AMA	35
5-1	Cable	R.R.	27
5-1	Ground	AMA	63
5-1	Ground	R.R.	2
Unit Total			127
8-1	Ground	AMA	2
8-1	Ground	R.R.	1
Unit Total			3
9-1	Cable	AMA	14
9-1	Cable	R.R.	10
9-1	Ground	AMA	27
9-1	Ground	R.R.	3
Unit Total			54
9-2	Cable	AMA	4
9-2	Cable	R.R.	3
Unit Total			7
9-3	Ground	AMA	54
9-3	Ground	R.R.	3
Unit Total			57
15-1	Cable	AMA	8
15-1	Cable	R.R.	9
15-1	Ground	AMA	7
15-1	Ground	R.R.	1
Unit Total			25
15-2	Cable	AMA	8
15-2	Cable	R.R.	1
15-2	Ground	AMA	37
15-2	Ground	R.R.	5
Unit Total			51

2.3.1.3.1. Design features and mitigation measures specific to Density Management in Alternative 2

Timber harvesting (ground-based):

- In areas to be logged with ground-based equipment, use existing skid roads to the extent possible to reduce the potential soil impacts by concentrating them on areas that have already been impacted.

- Confine ground-based activities to designated skid trails. These skid trails would be approximately 12 feet in width and 150 feet apart.

- Ground-based logging would occur only during periods of low-soil moisture (normally July through October)

- Do not subsoil skid roads used in the ground-based logging areas because of concerns for root damage to the residual trees.

- Several landings would be used to harvest the timber. Landing size would be no larger than what is required to conduct a safe and efficient operation.

- Felling and yarding operations would be restricted during the peak bark-slip period (generally May 1 to July 15) if excessive leave tree damage occurs, as determined by the Authorized officer.

- New skid trails and ground-based equipment would generally be prohibited within RR. It is anticipated that trees cut in RR would be winched to existing roads or to locations outside of the RR.

- The purchaser may elect to cut and yard by a harvester/forwarder type equipment provided that the following measures are met:

  a. Except for manually felled trees which exceed the harvester capability, timber would be felled, limbed, bucked, and pre-bunched by a self-propelled, mechanical, track-mounted or rubber-tired harvester with a minimum boom reach of 27 feet using a single grip rotating harvesting head. The harvester would have a ground pressure rating of 6 psi (pounds per square inch) or less.

  b. The forwarder would be all wheel drive, capable of self-loading and unloading, and have rear tires or track type devices greater than 18 inches in overall width. Log forwarders with GVWs (Gross Vehicle Weight) greater than 15,000 pounds would have a minimum of three load-bearing axles.

c. Forwarding operations would be restricted to trails approved by the Authorized Officer. Generally, forwarding trails would not exceed 15 feet in total width, and would be no closer than 100 feet, center to center, where parallel trails are used. The location of the harvester trails would be marked on the ground with flagging by the Purchaser and approved in writing by the Authorized Officer prior to felling and yarding operations.

d. Harvester roads would generally not exceed 15 feet in width, nor be spaced less than 50 feet apart from center to center.

e. To minimize compaction and displacement, equipment would be confined to existing skid trails and roads as much as possible, minimize the number of forwarder passes, and the created slash from limbing and bucking would be placed onto the skid trails for the harvester and forwarder to walk on.

f. Yarding would be done with equipment capable of lifting and carrying logs fully suspended off the ground.

g. Log landings and transfer points would be limited to existing roads and turnouts, unless otherwise agreed to by the Authorized Officer.

Timber harvesting (Cable Yarding areas):

Cable yarding operations would be conducted in such a manner as to assure that associated impacts would not exceed those allowed under the Best Management Practices identified in the Salem RMP (Appendix C-1 and C-2).

- Generally, all logs would be fully suspended over streams and for 25 feet on either side over the adjacent banks.

- The skyline corridors would be placed no closer than 150 feet apart at one end and the maximum average width would be 12 feet.

- The number of landings and their size would be kept to a minimum required to reasonably harvest the units. Landings would be located by the purchaser and approved by the BLM.

- Hand water bar cable yarding corridors immediately after use where extensive gouging occurs as determined by the Authorized Officer.

- Where possible, retain unmerchantable tops and limbs within the treated stands. Trees intended to be retained for down woody debris would be felled contour to

slope where possible.

- Cable corridors should be established at 90% angles (or as close as possible to 90 degrees) to RR in order to avoid adverse impacts to water courses (e.g. increased stream temperature, increased risk of sedimentation).

2. Watershed Restoration and Road Management

Approximately 3.9 miles of new road would be constructed. In addition, approximately 2.3 miles of road would be reconstructed. All of the new road construction, and almost all of the road reconstruction would be temporary, natural surfaced road, and would be decomissioned at the completion of the project. Approximately, 2000 feet of road would be reconstructed and not decommissioned. An additional 1.1 miles of old roads and skid trails which would be associated with the timber sale would also be decomissioned at the completion of the project. The net decrease in road density at project completion would be approximately 3.4 miles. Two- 18" culverts on an ephemeral stream on the BLM 1-5-3.1 road will be removed.

3. Wildlife Habitat Enhancement

Approximately 192 acres of wildlife habitat enhancement would occur. Table 2 shows a acreage summary of the various units for both Alternative 2 and 3. Figure 2 shows the location of the Wildlife Habitat Enhancement Units.

Table 2. Scoggins Creek Project
Wildlife Habitat Enhancement Treatment Units - Acreage Summary

Unit number	Alternative 2	Alternative 3
W1-1	78.0	78.0
W3-1	26.3	26.3
W3-2	34.8	34.8
W3-3	10.0	10.0
W5-1	17.7	17.7
W8-1	12.9	9.6
W9-1	4.8	4.8
W9-2	6.7	6.7
W9-3	0	17.9

Total Acres	191.2	205.8

2.3.1.4 Alternative 3

The location of the work described in Alternative 3 can be found on Figure 3. The design features and the objectives and rationale for developing Alternative 3 are the same as Alternative 2 with the following exceptions.

1. Density Management in the Adaptive Management Area (AMA) and in Riparian Reserves (RR)

Density Management would occur on 542 acres using helicopter logging. Approximately 177 acres would occur inside of Riparian Reserves. It is anticipated that this alternative would generate approximately 7.044 mmbdft of Douglas-fir timber.

Table 3. Scoggins Creek Project
Alternative 3 - Helicopter Yarding,
Summary of the Proposed Density Management Treatment Units
by Land Allocation and Acreage

Unit Number	Land Allocation	Acres	Unit Number	Land Allocation	Acres
3-1	AMA	21	9-1	AMA	45
3-1	R.R.	18	9-1	R.R.	15
Unit Total		39	Unit Total		60
3-2	AMA	82	9-2	AMA	4
3-2	R.R.	84	9-2	R.R.	3
Unit Total		166	Unit Total		7
3-3	AMA	11	9-3	AMA	24
3-3	R.R.	3	9-3	R.R.	1
Unit Total		14	Unit Total		25
5-1	AMA	98	9-4	AMA	9

5-1	R.R.	30	Unit Total		9
Unit Total		128	15-1	AMA	17
8-1	AMA	8	15-1	R.R.	9
8-1	R.R.	10	Unit Total		26
Unit Total		18	15-2	AMA	45
			15-2	R.R.	5
			Unit Total		50

2.3.1.4.1 Design features and mitigation measures specific to Density Management in Alternative 3

In addition to the design features by project type discussed in section 2.3.1.2., the following design features would apply to the helicopter logging areas:

- Five helicopter landings would be constructed through out the project area.
- Each landing would be approximately ½ acre in size and at least a part of it would be rocked if the purchaser decided to work during wet weather. At the completion of harvest, the rock would be removed from these landings, the landings would be sub-soiled and Red Alder would be planted to help restore site productivity.
- Fueling for the helicopter would occur at least 200 feet away from a stream course.
- No helicopter yarding would occur between March 1 and July 7 to minimize the potential for disturbance to unsurveyed suitable spotted owl habitat. Between July 8 and August 5, yarding flight paths would be designed to avoid areas containing unsurveyed suitable murrelet habitat by at least 0.25 miles; based upon the current placement of the proposed landings, this would most likely impact only the yarding operations within section 15. Daily time restrictions between July 8 and August 5 are not necessary since the flight paths would be adhered to. Between August 6 and September 15, all helicopter yarding which occurs and takes place within 0.25 miles of unsurveyed suitable murrelet habitat can either use designated flight paths and not adhere to daily time restrictions, or adhere to daily time restrictions which would begin two hours after sunrise and would end two hours before sunset.
- Where possible bunch logs before choking or minimize the length of choker cable to avoid

dragging logs over the ground or rolling logs downhill.

- If landing locations need to be changed the Resource Area wildlife biologist needs to be consulted in order to ensure that disturbance to the Northern Spotted owl and the Marbled Murrelet does not exceed the levels described in this EA.

2. Watershed Restoration and Road Management
Approximately 474 feet of road reconstruction would occur and later decomissioned, there would be no new road construction. The net decrease in road density would be 474 feet after completion of density management. An additional 2.4 miles of road would also be decomissioned, and a 42" culvert would be removed in T1S R5W Section 1.

- Road decomissioning would be completed during periods of low soil moisture and where appropriate during the in-water work period (July 1 to September 30).

- For the culvert removal in T1S, R5W, Section 1, the work would be completed between August 6th and September 30. All work which would result in the generation of noise above the ambient level between August 6 and September 15 would incorporate daily time restrictions limiting work to the period between two hours after sunrise to two hours before sunset.

- Any trees that need to be felled to remove the culvert in T1S, R5W Section 1 would be retained on site. No trees that are potentially suitable as nest trees for spotted owls, marbled murrelet or bald eagles would be felled.

3. Wildlife Habitat Enhancement
Approximately 206 acres of wildlife habitat enhancement would occur. Table 2 shows a acreage summary of the various units for both Alternative 2 and 3.

2.3.1.5. Comparison of Alternatives for Selected Parameters

The three alternatives are compared in Table 4.

Table 4. Treatment Area Summary. This table summarizes differences in selected parameters associated with the Density Management, wildlife habitat enhancement, and watershed restoration proposals for the three alternatives.

PARAMETERS		ALTERNATIVES	

	Alternative 1	Alternative 2	Alternative 3
Total Acres Treated with Density Management (approximate)	0 acres	526 acres	542 acres
Acres of Density Management in Riparian Reserves (this is a subset of the first row)	0 acres	152 acres	177 acres
Logging System	no timber harvest	262 acres of ground based 264 acres of a cable	542 acres of helicopter logging
Estimated Harvest Volume (MMBF or million board feet)	no volume generated	6.86 mmbf	7.044 mmbf
Wildlife habitat enhancement	0 acres	192 acres	206 acres

New, temporary road construction	0 miles	3.9 miles	0 miles
New permanent road construction	0 miles	0 miles	0 miles
Road reconstruction	0 miles	2.2 miles	474 feet
Road decomissioning	0 miles	7.0 miles	2.4 miles
Change in road density associated with density management proposals	0 miles	3.0 miles	-474 miles

Economic Analysis

In the Proposed Action (Alternative 2), it is estimated that the logging and other associated costs would be:

$428,750	Logging & hauling costs, ground based yarding
686,000	Logging & hauling costs, cable yarding
33,000	Road reconstruction costs (2.2 mi.)
78,000	New temporary road construction costs (3.9 mi.)
27,300	Decommission new roads (3.9 mi.)
21,544	Decommission existing roads (3.1 mi.)
160,000	Road maintenance, use fees
$1,434,594	Total costs

Net revenue generated by the Proposed Action is estimated by the following:

$2,744,000	Value of logs delivered to the mill (6,860 MBF)
-1,434,594	Total costs
$1,309,406	Net revenue

In the Helicopter Alternative (Alternative 3) is is estimated that the logging and other associated costs would be:

$2,288,000	Logging & hauling costs, helicopter yarding
1,350	Road reconstruction costs (.09 mi.)

4,100	Landing construction (5 landings)
630	Decommission new roads (.09 mi.)
150,000	Road maintenance, use fees
$2,444,080	Total costs

Net revenue generated by the Helicopter Alternative is estimated by the following:

$2,812,000	Value of logs delivered to the mill (7,030 MBF)
-2,444,080	Total costs
$367,920	Net revenue

The above calculations were based on the following assumptions:

a) Stump to mill ground based yarding costs = $125/MBF
b) Stump to mill cable yarding costs = $200/MBF
c) Stump to mill helicopter yarding costs = $325/MBF
d) Natural surface road construction costs = $15,000/mile
e) New permanent road construction costs = $75,000/mile
f) New temporary road construction costs = $20,000/mile
g) Road decommissioning costs = $7,000/mile
h) Log values delivered to mill = $400/MBF

CHAPTER 3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This Chapter shows the present condition (i.e., affected environment) within the project area. The "no action" alternative sets the environmental baseline for comparing effects of the action alternatives.

Appendix 4 contains a description of past, present, and reasonably foreseeable future actions.

For a full discussion of the physical, biological, and social resources of the Salem District, refer to the FEIS (Final Environmental Impact Statement), dated September, 1994, for the Salem District Resource Management Plan. The discussion in this EA is site-specific and supplements the discussion in the Salem District FEIS.

3.2. Major Issue - Soils

The Washington County Soil Survey County Survey identified three soil series within the project area, the Hembre, Olyic and Tolke. They developed from basalt, diabase, tuffaceous sandstone, siltstone and volcanic ash. Their profiles typically consist of about a foot thick of silt loam surface over a silty clay loam subsurface horizon which extends from 40 to 60 inches or more to bedrock. They are moderately permeable and well drained. There are a few, small inclusions of poorly drained soils in depressions and swales and shallow rocky soils on ridgetops. Proposed timber harvest units are on generally stable hillslopes, benches, and ridges. These soils are highly productive (Site Class 2, Site Index 170-100 year base age) due to favorable properties, mild temperatures and abundant moisture. Vegetation generally reestablishes quickly after deforestoration. Forest stands are currently fully occupied by tree canopies.

The average slope for the proposed density management thinning units ranges from 15% to 30%. (Appendix 2, Table G-2). Most of the steep (>60%) slopes within the project area are within Section 3 and associated with streams.

Past tractor logging, especially during the 1950's thru 1960's, resulted in a large network of roads and skid trails. The most disturbed ground included in the Proposed Action occurs on broad ridgetops in Units 3, 5, 9, 15 where an estimated 25% of the area is compacted. Skid trails are commonly 10 to 14 feet wide and partially covered by brush with some young trees along the edges. Overall, it is estimated that about 15% of the land proposed for ground-based harvesting is compacted.

The main management concern for these soils are their sensitivity to compaction and their risk to

erosion due to their high portion of silt and low gravel contents. These soils are easily compacted by heavy equipment operations or dragging logs, especially when they are moist or wet. Ground-based yarding (e.g. tractor logging, skidders) has by the far the greatest effect on compaction. The risk of soil loss from erosion in well-managed woodland on these soils are slight on areas with slopes less than 30%, moderate on areas with slopes of 30 to 60%, and severe on areas with slopes more than 60%.

3.3. Water

1. Physical Setting

The project area is located in the Coast Range physiographic province beside the Willamette depression in northwestern Oregon. Elevations range from 650 to 2,200 feet in the project area and up to 3,160 feet above sea level (ASL) in the upper Tualatin River 6th field watershed. The area is characterized by low mountains composed of gently sloping ridges that are highly dissected by many draws and creeks and steep river canyons. Outside the major canyons, steep hillslopes are usually short, averaging less than 1,000 feet in length.

The primary geologic unit underlying the area is Diabase Intrusive. In addition, there are small areas of Yamhill Formation, consisting mostly of siltstone and tuffaceous sandstone and Basalt of Hembre Ridge, composed of basalt pillows and sheet flows. These geologic units formed during the Eocene under a marine environment. There are also a few large ancient landslides, mostly now inactive, that formed during Pleistocene (USGS, 1994).

The analysis area is typical of the Oregon Coast Range in both climatic and hydrologic features. Temperatures are mild, winters wet and the summers cool and mostly dry. Annual precipitation falls mostly between November and March and averages about 60 to 100 inches, increasing with elevation. Precipitation intensity for a mean 2-year, 6 hour period is 1.6 to 2.0 inches (N.O.A.A., Precipitation-Frequency Atlas 2, Volume X, Oregon). The principal driver of hydrologic processes in the watershed is rain. Some snowfalls in the higher elevations. Most of the area may occasionally receive snow, but the quantity and duration of the snow do not normally produce rain-on-snow events. Stream flows respond quickly to rainfall and are notably higher in winter than summer. Most peak flows are produced from large, moderately intensive winter storms that last several days. Subsurface flow is the dominant storm runoff mechanism. Overland flow rarely occurs on undisturbed forest floor due to the high soil infiltration and permeability.

The principal drainage for the project area is Sain Creek. Approximately 50 acres of the total 526 acres proposed for density management thinning is drained by Scoggins Creek and the upper Tualatin drainages including Lee Creek. Both the Sain Creek and Scoggins Creek flow into Henry Hagg Lake, a 59,910 acre-feet reservoir created behind Scoggins Dam which was completed in 1978. Water is stored in Henry Hagg Lake during the winter and released into Scoggins Creek during the summer and fall. Some of the storage water is used to augment flows during the summer on the Tualatin River. All of these waters within the project area eventually discharge

into the Willamette River. Hillsboro Reservoir, another municipal reservoir within the vicinity of the project area, is located on the Tualatin River at river mile 73.30.

2. Project Streams

The main stem Sain Creek is located in a narrow valley. It is mainly Rosgen B1, B2, and B3 stream types (moderately entrenched, moderate width/depth ratio, low to moderate sinuosity, and moderate gradient). The main stream gradient of East Fork Sain Creek averages 3.4%. Most streams adjacent to the treatment areas are small headwater streams which do not flow during the summer. Headwater streams commonly begin as moderately entrenched, gentle to moderately steep gradient channels with cohesive silt and clay substrate and often abruptly change into deeply entrenched, very steep gradient, bedrock streams (A1a+ stream type). Proposed treatment areas are dominated by erosion and sediment transport processes. When stream gradients drop, such as at Hagg Lake, Hillsboro Reservoir, or Wapato Valley, sediment deposition becomes the dominant process.

Rotation slumps and debris slides are the most common form of mass movement in the watershed. Slumps, soil creep, and earthflows are associated with hummocky, uneven broken terrain, seeps and displaced stream channels and silty/clayey-rich soils. Debris slides are more common on very steep (>70%) highly dissected, concave slopes, especially in inner stream gorges. Landslides are commonly associated with roads. GIS analysis show that 96% of the lands within the analysis area are on slopes less than 60%, and 89% of the lands are on slopes less than 40%. These numbers are probably 5 to 10% higher than reality due to the inability of the GIS analysis to detect short steep slopes.

3. Beneficial Uses

The beneficial uses associated with streamflow within the project area are salmonid fish (trout) spawning and rearing, resident fish and aquatic life and wildlife; below Hagg Lake they include water contact recreation, warm water fisheries, municipal, industrial, irrigation, and hydro-electric power. There are no known water rights within the Upper Tualatin and Upper Scoggins Creek watersheds and none downstream of proposed treatment areas in Sain Creek or Scoggins Creek watersheds until Hagg Lake. Municipal water sources include Hagg Lake and the Hillsboro Reservoir. Hagg Lake also provides storage for industrial use, water quality control, recreation opportunities, maintenance of fish life in the river, conservation of wildlife resources, flood control, and irrigation. The nearest water right for irrigation use is 1.7 miles away from the project area on the Tualatin River near Cherry Grove. There are no domestic water rights within 2 miles of the project area. Table 5 summarizes the beneficial uses associated with streamflow within the project area, and its distance from the project area.

Table 5. Beneficial Uses within the Project Area

Beneficial Use	Information Source	Stream	Upstream Project Action	Distance from Project Action
Resident Fish (warmwater and coldwater fish)	BLM	Sain Creek	Section 3 Section 5 Section 8 Section 15	Adjacent 2,500 feet 1,320 feet 2,500 feet
		Scoggins Creek	Section 1** Section 3	Unsurveyed 1,320 feet
		Upper Tualatin River	Section 5 Section 9	1,320 feet 500 feet
Anadromous Fish (e.g. steelhead, coho salmon, pacific lamprey)	ODFW	Sain Creek	Section 3 Section 5 Section 8 Section 15	6.4 miles 8.2 miles 5.8 miles 4.3 miles
		Scoggins Creek	Section 1** Section 3	3.9 miles 5.6 miles
		Upper Tualatin River	Section 5 Section 9	5.6 miles 3.4 miles
Hagg Lake (warmwater and coldwater fish, water contact recreation, livestock, municipal, industrial, irrigation)	BLM	Sain Creek	Section 3 Section 5 Section 8 Section 15	4.4 miles 6.2 miles 3.8 miles 2.3 miles
		Scoggins Creek	Section 1** Section 3	4,900 feet 2.6 miles
Hillsboro Reservoir (municipal use)	WRIS*	Upper Tualatin River	Section 5 Section 9	5.6 miles 3.4 miles
Irrigation Use	WRIS*		Section 9	1.7 miles

* WRIS = Water Rights Information System of the Oregon Department of Water Resources

** Portion of Section 1 is proposed for a wildlife project and a road decommissioning project.

Density Management thinning is not proposed in section 1. No ground disturbance is anticipated except for the removal of a 42" culvert on BLM 1-4-6.1 road.

4. Water Quality

Little water quality data were found for streams in the project area. The Oregon Department of Environmental Quality has not listed any stream segments within the project area that cannot meet the state water quality standards. The nearest stream reach that they identified is Scoggins Creek below Scoggins Dam where dissolved oxygen standards fall below federal standards for spawning salmonids.

Phosphorus was an earlier concern for the Upper Tualatin-Scoggins watershed. Researchers have since found that background levels were much higher than originally expected and that most of the sources of phosphorus appear to come from human sources such as agriculture and rural runoff and wastewater and sewer discharges in the lower watershed. Little phosphorus is expected to result from most forestry operations.

In 1993, 1994, and 1997, the Department of Fish and Wildlife (ODFW) conducted stream surveys on the upper 9.4 miles of Sain Creek. They found that the reach is fairly well shaded (a mean of 84.3%, helping keep water temperatures cool), and has a fair amount of large woody debris (49 key pieces per mile, most local streams). Aerial photos show that most of the riparian areas along the reach are greater than 25 feet in width and are dominated by a mix of hardwoods and conifers. ODFW data show that the mean stream bank erosion was 13%. For riffle habitat, channel substrates have 7.5% organic, 11.3% sand, 32.7% gravel, 25.8% cobble, 18.8% boulder and 3.9% bedrock.

Based upon ODFW stream surveys, spot macro invertebrate sampling, observations and inferences, project area streams are relatively healthy, being higher in quality than most regional streams. Aquatic habitat indicators including large woody debris, streambank condition, streamside shade, and pool frequency are properly or near properly functioning. According to the Matrix of Pathways and Indicators for the Oregon Coast Range Province (**APPENDIX 6**), the amount of gravel in riffle habitat found in Sain Creek would be classified in the "At Risk Category". Indicators are about midway between properly functioning and not properly functioning. A spot macro invertebrate assessment conducted on the upper Scoggins Creek and Sain Creek in June 1999 found a high dominance taxa indicating some amount of past or past degradement (*Upper Tualatin-Scoggins Watershed Analysis*). The high portion of fines found and dominance of specific macro invertebrate taxa in Sain Creek would seem to indicate that sediment delivery rates have been or are currently higher than under normal natural conditions. Sedimentation maybe impairing the biological function of some streams within the project area and reducing the useful lifespan of Hagg Lake.

Forest roads are the most likely the largest source of fine sediment in the watershed. Sediment is generated primarily when roads are used during the rainy season. The watershed is susceptible to

road generated sediment for the following reasons: 1) most rocked roads appear to have some fine grain material and are underlain by fine-grained soils, 2) road density is relatively high (about 5.2 mi/mi 2 in Sain Creek watershed), 3) many road segments are close to streams, high stream crossing density (approximately one crossing/mi in Sain Creek watershed), 4) mixed geology, and 5) and many road segments have long, steep sidehill cuts and deep ditches. In addition, many of the landslides appear to be associated with roads.

Additional water quality parameters (e.g., nutrients, dissolved oxygen, pesticide and herbicide residues, etc. [U.S. EPA 1991]) are unlikely to be affected by the proposed action and were not reviewed for this analysis.

For additional discussion of the environmental baseline conditions and trends, please refer to *The Upper Tualatin-Scoggins Watershed Analysis,* Appendix 4 (Past, Present, and Reasonably Foreseeable Future Actions) and Appendix 6 (Matrix of Pathways and Indicators).

3.4. Vegetation

3.4.1. Special Status, Special Attention Species and Noxious Weeds

Botanical surveys for Scoggins Creek project area began in June 2000. Special status plant species surveyed for included: Species listed under the BLM Manual 6840 categories, Survey & Manage Species listed under the Salem District Record of Decision dated 1995 and the Record of Decision and Standard and Guidelines, Jan 2001, and any species listed under the Endangered Species Act.

Special Status Species Found: None

Survey and Manage Species Found: Surveys were conducted to the protocols for each group (Survey Protocols for Component 2 Lichens v.2.0, Survey Protocols for Survey Strategy 2 Bryophytes v.2.0, Survey Protocols for Protection Buffer Bryophytes v.2.0, and Survey Protocols for Survey and Manage Strategy 2 v.2.0). In January 2001, a Record of Decision (ROD) for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standard and Guidelines was adopted. Although the species lists changed the Survey Protocols remained the same. Table 6 shows the species found within, and adjacent to, the Scoggins Creek Project area and the change of their status according to the Record of Decision and Standard and Guidelines, Jan 2001.

Table 6: Survey and Manage Species Found

SPECIES	1994 NFP Category	PRESENT STATUS
Nephroma resupinatum	Strategy 4	removed from list
Pannaria saubinetti	Strategy 4	Category F

Peltigera pacifica	Strategy 4	Category E
Sticta fuliginnosa	Strategy 4	removed from list
Sticta limbata	Strategy 4	removed from list
Lobaria pulmonaria	Strategy 4	removed from list
Lobaria scrobiculata	Strategy 4	removed from list
Nephroma laevigatum	Strategy 4	removed from list
Nephroma helveticum	Strategy 4	removed from list
Peltigera collina	Strategy 4	removed from list
Pseudocyphellaria anomala	Strategy 4	removed from list
Pseudocyphellaria anthrapsis	Strategy 4	removed from list
Pseudocyphellaria crocata	Strategy 4	removed from list
Antitrichia curtipendula	Strategy 4	removed from list
Buxbaumia viridis	Protection Buffer	Category D[1]
Helvela maculata	Strategy 1 and 3	Category B
Otidea onotica	Strategy 3 and PB	Category F

Both *Buxbaumia sp.* and *Tetraphis sp.* were located, during contract surveys, within the Scoggins Creek Project Area but were not identified to species. Additional surveys have been conducted by BLM staff to assure proper identification /verification for *Tetraphis, geniculata* in unit 9-1, 9-2 and 9-3 and each *buxbaumia spp* site. No sites were identified as *Tetraphis, geniculata* while one site was identified as *Buxbaumia, viridis.* Sites that could not be verified will not be considered as known sites.

Noxious Weeds found: *Hypericum perforatum, Cirsium vulgare, Ilex aquifolium Senecio jacobaea, Cirsium arvense, Rubus laciniatus, Rubus discolor, Cytisus scoparius.*

All noxious weeds identified within the project area were Priority III (established infestations). These weed species are commonly found throughout Western Oregon tending to occupy areas of high light.

For additional information on the affected environment relative to the Special Status, Special Attention Species and Noxious Weeds, refer to Appendix 8.

3.4.2. Forest (Adaptive Management Area and Riparian Reserve)

On January 14, 1999, an analysis was done of late-successional forest ***LSF*** stands on federal lands within the Upper-Scoggins Tualatin watershed. In that analysis, LSF was defined as those stands that are 80-years old or greater. The analysis showed that 3696 acres of federal land are forested and 513 acres (14%) meet the definition of LSF. This is 1% below the level identified in the 15% retention S&G (Standard and Guideline found in the Northwest Forest Plan Record of Decision, pages C-44 and C-45 (page C-45 is applicable to AMA). The stands proposed to be treated for Density Management are not included in the stands identified to meet the 15% S&G.

Under alternative 2, approximately 77% of the areas proposed for wildlife habitat enhancement, are located within those areas identified within the 15% Analysis Documentation which was completed to assure conformance with the 15 percent Retention S & G. These areas include all or parts of wildlife habitat enhancement treatment units W1-1, W3-1, W3-2, W5-1, and W9-1 which total approximately 140 acres. Alternative 3 proposes 15 acres of treatment in addition to those acres proposed under Alternative 2; approximately 6 of these additional acres, located in unit W9-3, where also identified in the 15% analysis.

For additional information on the affected environment relative to the Forest Resource, refer to Appendix 2.

3.5. Wildlife

Although large portions of the forested lands within the watershed are behind private gates which are often locked, the portion of the watershed that includes the proposed Scoggins Creek project has relatively high levels of disturbance. This is primarily due to high levels of forest management activities occurring on lands managed by the State of Oregon and private industrial lands. This general disturbance is most pronounced along arterial haul routes such as the Old Railroad Grade Road, Sain Creek Road, and especially the Stimpson Mainline Road.

There are no unmapped LSRs within the vicinity of the proposed action. The project area is not within designated spotted owl or marbled murrelet critical habitat nor a spotted owl RPA (Reserve Pair Area). There are no known special habitats (e.g., talus slopes, cliffs, caves, or mines or abandoned wooden bridges) within the vicinity of the proposed project.

The proposed Scoggins Creek density management treatment units are forested with trees that are approximately 35- to 50-years-old. The stands are strongly dominated by densely stocked Douglas-fir and are fairly homogenous in sizes and stand structure. Although Douglas-fir dominates most of the stands proposed for treatment, some stands contain various levels of hardwoods, primarily big-leaf maple and red alder that are present in patches and as single scattered trees. Madrone is an uncommon component in some units. In addition, limited amounts of western red cedar, cherry, grand fir and western hemlock are also present. A few of the stands contain or are in the vicinity of scattered or clumped larger trees.

Stands in the density management treatment areas and in some of the surrounding stands have an average of 4,573 cubic feet of CWD (Course Woody Debris) per acre. Levels of CWD, including both snags and downed logs, are near the upper end of the high range (1,980 to 4,840 cubic feet per acre) for Oregon Coast Range stands 50 to 79 years old as identified in the LSRA. According to the stand exam data, approximately 96% of the CWD volume is down wood and 4% is coming from snags. Approximately 22% of the conifer down wood volume is in decay classes 1, 2, and 3 and 78% is in the decay classes 4 and 5. There is a weighted average of almost 18 snags per acre which average about 10 inches DBH. Approximately 97% of these snags are less than 20 inches in diameter; and all snags greater than 20 inches DBH are in decay classes 4 and 5. Field exams have identified the presence of a few larger decay class 1 and 2 snags, that are generally associated with root rot pockets. These few larger hard snags are expected to be short-lived based on the poor condition of their root system.

There are no known occupied spotted owl or marbled murrelet sites within the vicinity of any of the proposed wildlife habitat enhancement project areas. The nearest known eagle nest is approximately two miles from a proposed habitat enhancement unit.

Portions of some of the proposed wildlife habitat enhancement units are considered to be marginally suitable for the spotted owl. Those which are not currently considered to be suitable owl habitat are considered to be owl dispersal habitat. Portions of the wildlife habitat enhancement unit W1-1, are considered suitable habitat for the spotted owl and bald eagle. Individual trees with suitable marbled murrelet nesting platforms may also be present in portions of this unit. Some of the areas identified for wildlife habitat enhancement treatment may be within 0.25 miles of suitable habitat for the spotted owl, marbled murrelet and/or bald eagle.

Table 7.
Bureau Special Status Species, S&M and Federally listed wildlife species which are potentially located within or near the Scoggins Creek projects.

Project: SCOGGINS CREEK PROJECT

Common Name	ESA	NWFP	BLM	Impact Synopsis
Mammals:				
Columbian White-tailed Deer	FE	-	FE	No - Not within expected range
Fisher	-	-	BS	No - Presence is very unlikely; negligible impact to habitat.
Fringed Myotis	-	ROD	BT	No - Negligible impact to habitat, see BE text
Long-eared Myotis	-	ROD	BT	No - Negligible impact to habitat, see BE text
Long-legged Myotis	-	ROD	BT	No - Negligible impact to habitat, see BE text
Red Tree Vole	-	S&M	-	Yes - Felling of Douglas-fir trees
Silver-haired Bat	-	ROD	BT	No - Negligible impact to habitat, see BE text
Townsend's Big-eared Bat	-	-	BS	No - Negligible impact to habitat, see BE text

Birds:				
Aleutian Canada Goose	FT	-	FT	No - No habitat
Bald Eagle	FT	-	FT	Yes - Habitat modification and potential for disturbance
Brown Pelican	FE	-	FE	No - No habitat
Harlequin Duck	-	-	BA	No - Not within current range
Lewis' Woodpecker	-	-	BS	No - Not within current range
Marbled Murrelet	FT	-	FT	Yes - Habitat modification and potential for disturbance
Northern Spotted Owl	FT	-	FT	Yes - Habitat modification and potential for disturbance
Northern Goshawk	-	-	BS	No- Negligible impact to habitat, see BE text
Peregrine Falcon	-	-	BS	No - No impact to habitat, see BE text
Purple Martin	-	-	BS	No - Presence very unlikely
Yellow-breasted Chat (WV)	-	-	BS	No - Not in range
Amphibians and Reptiles:				
Columbia Torrent Salamander	-	-	BS	Yes - Possible impact to habitat.
Cope's Giant Salamander	-	-	BA	No - Not in range.
Oregon Spotted Frog	FC	-	FC	No - Not in current range
Painted Turtle	-	-	BS	No - Not in range
Western Pond Turtle	-	-	BS	No - Not in range
Invertebrates: (arthropods and worms)				
American Acetropis Grass Bug	-	-	BS	No - No habitat
Insular Blue Butterfly	-	-	BS	No - No habitat
Oregon Giant Earthworm	-	-	BS	No - Not in range
Oregon Silverspot Butterfly	FT	-	FT	No - No habitat
Valley Silverspot Butterfly	-	-	BA	No - No habitat
Willamette Callippe Fritillary Butterfly	-	-	BS	No - No habitat

Invertebrates: (mollusks)				
Blue-grey Tail-dropper	-	0	-	Yes - Potential habitat
Evening Fieldslug	-	S&M	-	Yes - Potential habitat
Malone Jumping-slug	-	S&M	-	Yes - Potential habitat
Oregon Megomphix	-	S&M	-	Yes - Potential habitat
Papillose Tail-dropper	-	0	-	Yes - Potential habitat, species identified during surveys
Puget Oregonian	-	S&M	-	Ye s- Potential habitat
Warty Jumping-slug	-	S&M	-	Yes - Potential habitat

ESA - Endangered Species Act: **FE** - Federal Endangered; **FT** - Federal Threatened; **FC** - Federal Candidate

NWFP - Northwest Forest Plan: **S&M** - Survey and Manage; **ROD** - Bat species whose roost sites are protected in the ROD; **0** - Former Survey & Manage species which were included in surveys but have since been removed from the S&M list.

BLM - BLM Manual 6840 Special Status Specie Policy list: **BS** - Bureau Sensitive; **BA** - Bureau Assessment; **BT** - Bureau Tracking

Impact Synopsis: **NO**- No appreciable impacts to the species or it's habitat. Unless otherwise noted, no further analysis will be conducted in the EA. **YES** - Impacts to a species or it's habitat may occur and further analysis will be conducted in the EA.

3.6. Fisheries

The Scoggins Creek project area is located within the Scoggins watershed which feeds into the Upper Willamette River via the Tualatin River. The Scoggins drainage is a 5th field watershed draining 136 square miles in the eastern part of the Tualatin River Basin. The watershed contains the mainstem of the Upper Tualatin and two mainstem tributaries, Scoggins Creek and Sain Creek. The proposed timber harvest, watershed restoration work and wildlife habitat enhancement project areas are located within four 6th field watersheds, Lower Scoggins Creek, Upper Scoggins Creek, Sain Creek and Upper Tualatin River, most of the planned actions will occur within the Sain Creek 6th Field Watershed.

Selected fish species found within the Scoggins watershed are listed in Table 9. Coho salmon are not native to the Upper Tualatin watershed, but were introduced in the 1920's and now reproduce naturally within the watershed. In March of 1999, the upper Willamette ESU (evolutionarily significant unit) of steelhead, which includes the steelhead within the Upper Tualatin watershed, were federally listed as threatened under the ESA (Endangered Species Act). Upper Tualatin also falls within the Upper Willamette chinook salmon (*O. tshawytscha*) ESU area, however, chinook

are not known to inhabit this watershed, currently or historically aside from one observation. The project area is not considered to be designated Critical Habitat for the Upper Willamette Steelhead and Upper Willamette chinook salmon. Critical habitat ends at Haines Falls an anadromous barrier on Lee Creek, and outside the project area on the Upper Tualatin River, and areas above the dam that form Henry Hagg Lake are not considered to be designated critical habitat (Project record, 57). Fish distribution within the Scoggins Creek project area has been determined through presence/absence surveys conducted in 1999 and 2000. Though data on steelhead distribution in the Upper Tualatin watershed is minimal, the dam forming Henry Hagg Lake is a complete barrier to all fish. Two named falls are present on the Upper Tualatin. The first is Lee falls at River Mile 75, it has a rock-cut fishway allowing access to two miles of habitat. The second is Haines falls at River mile 77, which prevents anadromous distribution upstream. The closest point of anadromous fish distribution to the project planning area is approximately 3.5 miles upstream of Haines falls. Other fish species within the Scoggins watershed include bluegill, yellow perch, warmouth, largemouth bass, and smallmouth bass. These fish species are known to be present in Henry Hagg Lake and in the lower Tualatin River.

The three salmonids present in the Upper Tualatin watershed differ somewhat in their habitat, but all require cool water, structurally diverse channels and clean spawning gravel for maintenance of healthy populations. Less is known about the requirements of the non-salmonid species, however the same general habitat features are expected to benefit them as well. Large wood pieces play a vital role in maintaining channel complexity by creating scour to form pools, recruiting and maintaining spawning gravel, and providing cover. The *Upper Tualatin - Scoggins Watershed Analysis*, (BLM 2000), identified increased sedimentation and decreased large woody debris inputs as the major factors affecting salmonid habitat within this watershed, however amounts of large wood above Hagg Lake (ODFW Key Pieces) are of greater density than in many other Coast Range streams. Salmonid habitat, especially in the mainstems, is generally limited in the Tualatin Plain, and used mainly as migration corridors. The Tualatin Mountain portions of the drainage provide some quality salmonid habitat, however much of the habitat has been diminished due to past land management actions.

Table 8. Fish Species and Status within the Upper Tualatin Watershed

Common Name	Scientific Name	Status
Upper Willamette steelhead trout	*Oncorhynchus mykiss*	federally listed - threatened
Upper Willamette chinook salmon	*Oncorhynchus tshawytscha*	federally listed - threatened
cutthroat trout	*Oncorhynchus clarki*	
coho salmon	*Oncorhynchus kisutch*	introduced
Pacific lamprey	*Lampetra tridentatus*	Bureau sensitive
river lamprey*	*Lampetra ayresi*	Bureau sensitive

western brook lamprey	*Lampetra richardsoni*	
redside shiner	*Richardsonius balteatus*	
reticulate sculpin	*Cottus perplexus*	
torrent sculpin	*Cottus rhotheus*	

*presence not verified

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the fisheries affected environment. An analysis of detailed matrix indicators in the Sain Creek 6th and at the 5th field (Scoggins) watershed scale was conducted form data collected by the Oregon Department of Fish and Wildlife in 1993, 1994, and 1997. The Sain creek drainage was chosen for detailed analysis as 91% of the project area falls within this 6th field watershed. The other two 6th field watershed on either side of Sain creek are very similar in drainage patterns, gradient, amount of sand or silt and in the amount of Large Woody Debris. The amount of stream bank erosion is identical at the 5th field scale to that of Sain Creek 6th field. There are significantly more quality pools on average in the 5th field analysis than in the Sain Creek 6th field. Also it should be noted that none of this habitat analyzed is accessible to Upper Willamette steelhead or any other anadromous fish due to the dam that forms Henry Hagg Lake and an impassable barrier at Haines Falls on the Lee Creek Drainage. For these reasons detailed analysis was limited to the Sain Creek 6th Field.

CHAPTER 4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

The Soil major issue, as described in Chapter 1.5.1., defines the scope of environmental concern for this project. The environmental effects (changes from present baseline condition) that are described in this chapter reflect the identified major issue as well as four other elements of the environment (water, vegetation, wildlife, and fisheries). For those other resources or values which review is required by statute, regulation, Executive Order, or policy, Appendix 4 contains the appropriate documentation as to the effects of the proposed action on those resources or values.

4.2. Major Issue - Soils

Organic matter removal and soil disturbance (primarily compaction), and soil volume loss (erosion) are generally considered to be the most important determinants in which forest management activities can affect future forest soil productivity. The proposed forest activities are not expected to alter organic matter levels and soil organisms (including mycorrhizal fungi) and nitrogen to the degree that they would adversely impact soil productivity for the following reasons: Project soils due to their ashy natures, have high organic carbon contents, making them more resilient to physical and biological disturbance. According to the stand exam data, the current average total coarse wood debris levels are near the upper end of the high range. Sufficient organic matter, in the form of litter, logging debris and down logs, would be retained to maintain soil organic material, soil organisms and nutrient levels. In the few instances where planting would occur, site preparation would be limited to slashing all non-conifer vegetation and burning hand-piles. There would be no broadcast burning, soil surface scarification or clean mechanical piling.

Soil compaction, the reduction of total porosity, has been widely studied for the past 30 years and is relatively easy to measure. It can easily accumulate in time and space. Using standard wheeled or tracked equipment when the soil is moist or wet can cause severe compaction, especially with repeated passes with heavy equipment. Compaction can increase surface runoff or ponding. It can restrict water and gas movement, reducing root penetration and creating unhealthy living conditions for beneficial soil organisms such as fungi, nitrogen-fixing organisms, and arthropods. Reduction in root penetration can result in loss of seedling and tree growth and make tree more susceptible to windthrow.

Any practice which manipulates the top soil, especially by removing it, will reduce site productivity. The biggest threat to long-term soil productivity by topsoil displacement is from constructing roads and landings. Roads reduce forest productivity by the land they occupy.

Surface erosion can reduce productivity by removing the organic layer and it can deliver fine sediment to streams. Assessing soil erosion impacts on soil productivity is difficult. One measure that can be used to predict the potential for initiating erosion and sedimentation is the amount of

ground disturbance. Generally, the likelihood of erosion and sediment delivery increases with the amount of disturbance.

The units of measure selected to evaluate environmental impacts to soil resource will primarily be acres of disturbance, acres of compaction and a narrative of the effects of an action on soil productivity.

4.2.1. Alternative 1 (No Action)

4.2.1.1. Density Management, Watershed Restoration and Road Management

Under this alternative, current soil processes and conditions would continue to occur based on the existing conditions. Alternative 1 would not result in any additional soil disturbance, compaction, erosion or loss in productivity above background levels. Since there would not be any road decommissioning, there would be no net reduction in road mileage, reduction in water runoff or long-term opportunity to reduce erosion.

Cumulative Effects: The no action alternative would avoid potential cumulative effect of additional compaction from new harvest entries within the project area. Soil productivity would continue to slowly recover until the next soil disturbance. Additional off-site soil compaction resulting from coexisting land-use activities would likely continue to accumulate and potentially reduce soil productivity and increase overland flow within the watershed.

4.2.1.2. Wildlife Habitat Enhancement

The no action alternative would have no direct or indirect affect on the short and long term soil productivity. Current soil processes and conditions would continue to occur based on current conditions.

Cumulative Effects: Soil productivity would continue to slowly recover until the next soil disturbance. Additional off-site soil compaction resulting from coexisting land-use activities would likely continue to accumulate and potentially reduce soil productivity and increase overland flow within the watershed.

4.2.2 Alternative 2 (Proposed Action)

4.2.2.1 Density Management, Watershed Restoration and Road Management

Short-Term Effects

Under this alternative, forest management actions are expected to result in the following direct and indirect effects:

1. Project actions are estimated to result in 52 acres of soil disturbance and compaction or about 10% of the total treatment area. This would include about 35 acres from timber harvest, about 14 acres from construction of new temporary roads and reconstruction of existing roads, and about 4 acres from decommissioning existing roads.
2. After completion of this project (decommissioning about 20,880 feet of new temporary road, about 11,750 feet of reconstructed road, and about 6,500 feet of existing road), there would be a net decrease of about 3 miles of road or about 9 acres in the watershed.
3. Approximately 50% (262 acres) of the 526 acres to be logged would be ground-based yarded. Cable yarding systems impact the soil less and help maintain soil productivity better than ground-based yarding.
4. Approximately 152 acres of RRs would be logged. All except for about 21 acres of RRs would be cable yarded. (Machinery would not be allowed within the 21 acres of RRs except where they could be operated from an existing road. Yarding these areas will require that some large logs be pulled by a winch cable over the ground surface to an existing road or landing outside of the RR.)
5. Overall, it is estimated that all of the proposed actions would reduce soil productivity by about 10 acres (about 2% of the total treatment area).

Refer to Appendix 9, Table 1 & 2 and summary of assumptions used to predict soil disturbance, compaction and soil productivity losses.

Cumulative effects: Because soil compaction can persist for several decades, repeated forest entries into the same forest stands can cause compaction to accumulate on-site. It is estimated that an average of 15 percent of the lands that would be ground-based harvested are compacted. The length of time in which compacted soils in the project area will remain compacted and have undesirable affect on subsequent tree growth is uncertain. Little research has been done in the Oregon Coast Range. A research project in three coastal Washington locations studied the effect of wet-season tractor yarding on conifer growth after clear-cutting (Miller, 1996). The researchers found some short-term reductions in tree seedling survival and growth on skid trails compared to non-trail areas. However, after 7 or 8 years following planting, they found little or no difference in tree height and volume in skid trails from non-trail areas. They concluded that the initial favorable soil conditions and favorable climate conditions compensated for unfavorable soil compaction. Considering the following factors: 1) Favorable growing conditions and soil properties within the project area- high moisture, mild to moderate temperatures, medium to long growing seasons, high soil organic matter levels and low bulk densities) and 2) Most of the compaction is expected to be moderate (due to the project design features minimize ground disturbance), it is reasonable to expect that these soils would recover from most of the negative effects of disturbance on soil productivity from the proposed action relatively quickly, probably within 10 to 15 years. Skid trails would not be subsoiled after harvest to avoid damage to tree roots. The next entry would probably be at least 20 years away

Off-site cumulative effects can occur from the contribution of accumulation effects from coexisting land-use activities. An analysis of cumulative effects on soil resources was conducted to address the effects of the proposed action along with past, present and reasonably foreseeable future

actions on soil disturbance within the Sain Creek, Upper Scoggins Creek, and Upper Tualatin River 6th field watersheds. Scoggins Creek 6th field was not included in the analysis because no additional increases in compaction from the proposed action are anticipated.

Looking at the existing and anticipated road construction and timber harvest gives a reasonable picture of the amount of soil disturbance in the watershed. Besides potentially affecting soil productivity, soil disturbance (compaction) can cumulatively affect the hydrology in a watershed by decreasing the aerially averaged infiltration rate and increasing water runoff peaks. Disturbed lands were identified by analyzing GIS (Geographic Information System) data sets. Lands which are currently disturbed and most likely to become disturbed in the reasonable future were defined as roaded areas and lands capable of being ground-based yarded. Roaded areas were assumed to be a figure 40% higher than what the GIS analysis showed to account for undercounting and recent road construction. Lands disturbed by ground-base yarding were analyzed by identifying areas with Forestry zoning and with slope gradients less than 40%. It is assumed that 25% of this area has been or would be disturbed by ground-based equipment. Using these assumptions, there are about 260 miles of road, or about 725 acres assuming an average disturbance width of 23 feet, and 7,090 acres of land disturbed by ground-based equipment. This would be about 22%of the three 6th field watershed area. This is considered to be a conservative figure. The area disturbed by ground-base yarding could be much higher, it does not include disturbance from cable yarding, and the road area does not include future road construction.

The 25% soil disturbance level indicates that soil productivity has been or would be impacted on a large portion of the watershed, and that the overall productivity of soils has been reduced. Considering that magnitude of any effect is generally proportional to the severity and amount of disturbance. The 52 acres of potential soil disturbance from this project action would have minimal effect on the overall soil productivity of the watershed.

4.2.2.2. Wildlife Habitat Enhancement

Under this alternative, there would be no direct or indirect affect on short or long term soil productivity. Proposed actions (e.g., girdling, felling of trees) would not disturb the ground surface. Felling a small number of trees would add a small amount of organic matter to the forest floor. The small addition of organic would have a slight beneficial affect at the site level, but not be large enough to alter soil productivity at the project level. Current soil processes and conditions would continue to occur based on current conditions.

Cumulative Effects: Proposed action would not result in ground disturbance or alteration in soil productivity. Therefore, there would be no cumulative effects.

4.2.3. Alternative 3 (Helicopter)

4.2.3.1 Density Management, Watershed Restoration and Road Management

Under this alternative, forest management actions are expected to result in the following direct and indirect effects:

1. Project actions are estimated to result in about a total of 14 acres of soil disturbance and compaction (about 2% of the total treatment area). A part of each landing would be rocked if the purchaser decided to work during wet weather. Helicopter logging can be expected to result in mostly light compaction and minimal erosion and ravel.
2. Yarding by helicopter is not expected to measurably alter soil productivity on the approximate 551 acre treatment area. It is estimated that there would be about a net loss of 2 acre of soil productivity on landings and road segment.

Cumulative Effects: There would be a minimal increase (less than 1%) in accumulated compacted surfaces and loss in soil productivity within the project area as the result of the proposed action. The proposed action would not measurably alter the total area of compacted surfaces or net soil productivity within the watershed as described in Section 4.2.2.1.

Refer to Appendix 9, Tables 3 & 4 and summary of assumptions used to predict soil disturbance, compaction and soil productivity losses.

4.2.3.2. Road Decommissioning

Under this alternative, forest management actions are expected to result in the following direct and indirect effects:

1. Approximately 2.8 miles of natural surface roads would be removed from the road base after decommissioning.
2. Decommissioning these road segments would result in about 4.7 acres of soil disturbance.
3. It is estimated that by subsoiling these roads, the infiltration rate would increase and the soil productivity would be improved by an average of about 50% on 2.4 miles or about 2.5 acres.

Refer to Appendix 9, Tables 5 & 6 and summary of assumptions used to predict soil disturbance, compaction and soil productivity losses.

Cumulative Effects: There would be a small reduction (less than 1%) in accumulated compacted surfaces and net increase in soil productivity within the project area as the result of project action. The proposed action would not measurably alter the total area of compacted surfaces or net soil productivity within the watershed.

4.2.3.3. Wildlife Habitat Enhancement

With the exception of an additional 14 acres, the actions proposed in this alternative are the same as in Alternative 2. As in Alternative 2, the proposed action in this alternative would not disturb the ground surface or alter the short or long term soil productivity. Felling a small number of trees

would add a small amount of organic matter to the forest floor. The small addition of organic would have a slight beneficial affect at the site level, but not be large enough to alter soil productivity at the project level. Current soil processes and conditions would continue to occur based on current conditions.

Cumulative Effects: Proposed action would not result in ground disturbance or alteration in soil productivity. Therefore, there would be no cumulative effects.

4.3. Water

4.3.1. Alternative 1 (No Action)

4.3.1.1. Density Management, Watershed Restoration and Road Management

Under this alternative, there would be no timber hauling, road construction or harvesting activity which could increase ground disturbance, anthropogenic erosion and sedimentation. Since no roads would be decommissioned, there would not be an opportunity to reduce water runoff, sedimentation and the road density in the watershed. Current trends of change would continue. Residual effects of past road development, timber harvest, and other land use activities would continue to affect existing stream flows and water quality conditions.

Cumulative Effects: Proposed action would not result in ground disturbance or alteration in hydrology. Therefore, there would be no cumulative effects.

4.3.1.2. Wildlife Habitat Enhancement

No action would result in the continuation of current conditions and trends within the project area. Like Alternative 2 and 3, there would be no increase ground disturbance, anthropogenic erosion and sedimentation. Unlike Alternative 2 or Alternative 3, this alternative would not promote late-seral forest habitat development and promote conifer growth, which could be a future source of large wood for aquatic habitats.

Cumulative Effects: Proposed action would not result in ground disturbance or alteration in hydrology. Therefore, there would be no cumulative effects.

4.3.2 Alternative 2 (Proposed Action)

4.3.2.1 Density Management, Watershed Restoration and Road Management

Short-Term Effects

Summary

This alternative is unlikely to substantially alter, impede and/or prevent attainment of the water quality, channel function, stream flow and basin hydrology objectives of the Aquatic Conservation Strategy (Refer to the Appendix 5). This is a proposed density management thinning project where post treatment canopy levels are expected to remain above 50%. There maybe some small, short-term increases in sedimentation and stream turbidity, but increases in mass wasting and changes in the sediment regime are unlikely. There may be some alteration in the water capture, infiltration and routing. Any change would be difficult to measure and not large enough to substantially change stream flow, sediment regime and channel morphology. Any increases in flow would be expected to return to pre-existing conditions when the canopy grows back together.

1. Water Quality

This alternative would result in approximately 17.6 acres of disturbance from construction of temporary roads and reconstruction of existing roads. Road construction and decommissioning would be restricted to periods of low rainfall and surface runoff. All new temporary road construction would be located away from drainages and outside of RRs, thereby limiting the potential for routing sediment and interception or disruption of subsurface water. Road decommissioning following timber harvest would result in a net reduction in 3 mile of road mileage within the project area. Subsoiling roads will partially restore their hydrologic function by increasing soil infiltration and permeability, reducing erosion, and encouraging vegetation recovery.

The main haul routes would likely be along the Old Rail Road Grade/Stimpson Main Line, Sain Spur Road, or the county Sain Creek Road, all rocked surfaces. Most of the drainage structures along these roads have recently been upgraded. There are approximately 6 stream crossings on the Old Rail Road Grade/Stimpson Main Line, 8 crossings on the Sain Creek Spur, and 2 on the Sain Creek Road. Due to the proximity of roads to streams and multiple stream crossings, log hauling on these forest gravel roads, particularly when the water is flowing on roads and into ditches, would generate fine sediment which could potentially increase sediment delivery and local stream turbidity. The Sain Creek Road which accesses most of section 3, would only be used for log hauling during periods of low soil moisture. Low traffic volume/day, rocked roads, and restrictions of road use activity during heavy rains should keep any increases in sediment and turbidity small and short-term.

Approximately 35 acres of ground would be disturbed from timber harvest activities. Little sediment delivery from yarding is expected because there would be much less disturbance. There would not be any yarding corridors or skid trails created which could route surface water and sediment to streams. Most of the lands are on slopes less than 40% and areas near streams would not be logged where there high risk for mass wasting. In addition RRs would have a 100-foot “no cut” buffer on both sides of fish bearing streams and a 50-foot on a non-fish bearing streams and wetlands.

Timber harvesting is not expected to substantially alter current shade levels along streams thereby maintaining stream temperatures. “No-cut” buffers would be placed along all stream channels (50-

foot on non-fish bearing and 100-foot on fish bearing stream). While logs would be fully suspended while cable yarding over streams and adjacent stream banks, there is a low risk of some damage to residual trees. Any damage would be likely be small and short-term. Most stream channels in the project area are well shaded and do not flow during the summer. Streams which flow during the summer generally receive little solar radiation due to their narrow channel widths, thicker riparian vegetation and topographic shading. Most summer flowing streams are located in deep narrow valleys or canyons.

2. Streamflows

Streamflows are not expected to be measurably affected by this alternative. This is a density management thinning, not a full harvest. The portion of the watershed that would be harvested under this alternative is small (less than 7% of the Sain Creek 6th field watershed). Most of the tree removal would occur in areas dominated by rainfall, where snow does not normally accumulate. None of the roads proposed for construction cross any streams or are likely to intercept ground water. The net amount of roads would be reduced by about 2¼ miles. Any changes in the capture and routing of precipitation would likely return to pre-treatment conditions as the remaining forest fills out.

3. Channel Stability and Function

This alternative would not adversely affect the physical integrity of the aquatic systems because retention of untreated portions of the RRs along streams would maintain root strength and streambank integrity.

2. Long-Term and Cumulative Effects

In the long-term, this alternative would benefit the watershed by decreasing the net road mileage by 3 miles and decrease water runoff and sediment delivery from roads. Thinning in RRs (approximately 161 acres) would speed the development of a future supply of larger woody debris, which could contribute maintaining and restoring aquatic habitats. In forest lands, channel morphology is in large part determined by the presence or absence of LWD(large woody debris). LWD creates complexity by forming pools, shortens channel gradients and help dissipates the stream energy thereby reducing scour and enhancing sediment storage. Presence or absence of LWD is usually the most critical factor in maintaining or improving forest aquatic habitats.

A “Level 1" analysis of the risk for cumulative effects to hydrologic processes, channel conditions and water quality for the Sain Creek, Upper Scoggins Creek, and Upper Tualatin sub-watersheds were conducted utilizing the Salem District Watershed Cumulative Effects Analysis Procedure, FY1994. The following conditions were observed:

Table 9. Watersheds Characteristics based primarily upon GIS data

	6th Field Watershed			Total/ Average
	Sain Creek	**Upper Scoggins Creek**	**Upper Tualatin River**	
Surface Area	7,305 Ac	9,440 Ac	15,195 Ac	Total = 31,940 Ac
Proportion of Watershed Zoned for Forestry	100%	100%	100%	Total = 100%
BLM Land Area / (% of watershed)	1,015 AC 13.9%	150 AC 1.6%	775 AC 5.1%	Total = 1,930 AC Average = 6.0%
BLM Lands Proposed for Density Management Thinning (% of watershed)	492 Ac (6.7%)	21 Ac (0.2%)	32 Ac (0.2%)	Total = 526 Ac Average = (1.7%)
BLM Land in Young-Stand & Non-Forest Condition (% of watershed)	424 Ac (5.8%)	128 Ac (10.4%)	106 Ac (0.7%)	Total = 658 Ac Average = (2.1%)
Land in Young-Stand, grass-for & Non-Forest Condition (% of watershed)	1,350 Ac (18.5%)	1,060 Ac (11.2%)	1,1095 Ac (7.2%)	Total = 36,488 Ac (56%)
Road Density *	5.8 mi/mi^2	5.2 mi/mi^2	4.9 mi/mi^2	Average = 5.2 mi/mi^2
Area within ROS zone** (% of watershed)	1,420 Ac (20%)	4,230 Ac (45%)	10,600 Ac (70%)	Total = 16,250 Ac Average = (51%)
Area disturbed or will be disturbed by Ground-based equipment	1,750 AC	2,060 AC	3,280 AC	Total = 7,090 Ac Average = (22%)
BLM Lands Proposed for Density Management Thinning within ROS zone (% of watershed)	95 (1.3%)	20 (0.2%)	30 (0.2%)	Total = 145 Average = (0.4%)

* Assumes that the actual road mileage is 40% higher than in GIS database due to undercounting of legacy roads and recently built roads.

** It is assumed that the ROS (rain-on-snow) zone ranges from 1,700 feet to 3,000 feet.

1) No unstable hillslopes would be treated. "No-cut" buffers would be placed on all stream channels (50-foot on non-fish bearing and 100-foot on fish bearing stream).
2) For the most part, project area streams including Sain Creek are or close to properly functioning. Riparian zones are intact and stream banks appear to be mostly stable. One factor indicator for concern is the high portion of fines in the channel substrate (Refer to Appendix 6 - Matrix of Pathways and Indicators).
3)While existing road densities (5.8 to 4.9 mi/mi^2) are considered to be at high risk for groundwater intercepting and routing of flow, following road decommissioning there would be a net reduction of about 3 miles of road mileage. In addition, roads proposed for construction, reconstruction and decommission are located primarily on stable benches and near the ridgetops away from drainages thereby limiting the potential for routing sediment and interception or disruption of subsurface water.
4) This proposal is for density management thinning, not a full harvest. Post treatment canopy levels are expected to remain above 50%.
5) Most of the private and state forest stands within the sub-watersheds are old enough (greater than 40 years in age) to be thinned or clear-cut harvested within the next 10 years. ODF has timber sales planned for harvest on roughly 190 acres in Sain Creek and 185 acres in Upper Scoggins Creek watersheds. During the past 7 years, roughly 1,100 acres were clear-cut harvested within the Sain Creek watershed.
6) Stream channel characteristics along main stem Sain Creek has a relatively high frequency of obstructions -39.1% of all substrate is composed of cobble and boulders; 49 key pieces of LWD per mile, low sinuosity, moderate entrenchment, moderate gradient) and the fact that most stream banks are stable indicate stability and low sensitivity to channel scour.

Considering the above factors and the Past, Present and Reasonably Foreseeable Future land use actions within the watershed, the risk for this proposal for contributing to cumulative effects to hydrologic processes or water quality in these watersheds is low. There maybe some modest increases in flow from relatively small storms in the beginning part of the wet seasons. Early fall storms usually produce less total rainfall than those later in the fall and winter and are typically not channel forming flows. Consequently, stream scour and bank erosion from peak flows are not likely to occur as a result of proposed logging and road building.

4.3.2.2. Wildlife Habitat Enhancement

This alternative is not expected to alter water quality conditions and basin hydrology including stream flow and channel condition. Stream water temperatures would be maintained because no tree which could reduce stream shade appreciably would be topped, girdled or felled. The existing levels of sediment delivery would be maintained because there would be no additional ground disturbance. Stream banks would be protected by leaving trees which could potentially undermine banks untreated.

Trees that fall into stream channels as the result of the treatment would provide some short-term benefits such increasing stream structure, creating additional aquatic habitat, and dissipating

streamflow energy. In the long-term, the proposed action would help to promote conifer growth and late-seral stage habitat development and thereby provide a future source of large conifer logs for streams.

No cumulative effects are anticipated from the project action.

4.3.3 Alternative 3 (Helicopter)

4.3.3.1 Density Management, Watershed Restoration and Road Management

Short-Term Effects

Summary

Alternative 3 is not expected to alter water quality conditions and basin hydrology including stream flow and channel condition. Alternative 3 would result in approximately 13.68 acres of ground disturbance.

4.3.3.2 Water Quality

Summary

Alternative 3 is unlikely to substantially alter, impede and/or prevent attainment of the water quality, channel function, stream flow and basin hydrology objections of the Aquatic Conservation Strategy (Refer to the Appendix 5). This is a proposed density management thinning project where post treatment canopy levels are expected to remain above 50%. Compared to Alternative 2, there would be a reduction in the level of disturbance, erosion and sedimentation. Changes in the sediment regime would remain unlikely. There maybe some small, short-term increases in sedimentation and stream turbidity, but increases in mass wasting and changes in the sediment regime are unlikely. There may be some alteration in the water capture, infiltration and routing. Any change would be difficult to measure and not likely be large enough to substantially change stream flow, sediment regime and channel morphology. Any increases in flow would expected to be expected to return to pre-existing conditions when the canopy grows back together.

1. Water Quality

Alternative 3 would result in approximately 2½ acres of disturbance from construction of landings and reconstruction of an existing road. Roads and landings are on or near ridgetops away from drainages and outside of RRs and construction would be restricted to periods of low rainfall. No sediment delivery or interception or disruption of subsurface water is expected from these activities. Subsoiling landings and the road will partially restore their hydrologic function.

Timber yarding by helicopter would result in about 13.6 acres of mostly light disturbance.

Increases in sediment delivery and turbidity levels would decrease compared to Alternative 2.

As compared to ground-based and cable logging systems, timber yarding by helicopter would greatly lower the amount of soil disturbance and erosion. Less disturbance and erosion would reduce sediment delivery and turbidity.

Since the main haul routes and season of use would likely be the similar as in Alternative 2, the potential for hauling to increase sediment delivery and local stream turbidity would be similar.

Streams within the project are generally adequately shaded by riparian vegetation. Most stream channels within the project area do not flow during the summer. Project area streams which flow during the summer are commonly entrenched, confined by moderate or steep hillslopes and flow on easterly aspects and thereby reducing the streams capacity to hold heat. The proposed tree removal in the vicinity of streams are not expected to substantially altering current shade levels along streams thereby maintaining stream temperatures.

2. Streamflows

Streamflows are not expected to be measurably affected by this alternative. This is a density management thinning, not a full harvest. The portion of the watershed that would be harvested under this alternative is small (less than 7% of the Sain Creek 6th field watershed). Most of the tree removal would occur where rainfall is dominated and snow does not normally accumulate. The small length of road that would be reconstructed (about 474 feet) would not alter the existing hydrology. Any changes in the capture and routing of precipitation from tree removal would return to pre-treatment conditions as the remaining forest fills out.

3. Channel Stability and Function

Alternative 3 would not adversely affect the physical integrity of the aquatic systems because retention of untreated portions of the RRs along streams would maintain root strength and streambank integrity.

Long-Term and Commutative Effects

In the long-term, this alternative would speed the development of a future supply of larger woody debris by thinning the outer portion of RRs (approximately 177 acres). This supply would contribute to the future maintenance and restoration of physical integrity of the aquatic system. Since no roads would be decommissioned other than a short access road, this alternative would not reduce water runoff and sediment delivery from roads.

Compared to alternative 2, alternative 3 would reduce the level of intensity and the extent of ground disturbance by about 38 acres or 73%. There would be no decrease in net mileage associated with the density management treatments, unlike alternative 2 where there would be a 3

mile reduction. At either 5th field or 6th field watershed scale, the changes from alternative 2 would be too small to be quantified in a watershed level cumulative effects analysis. Consequently, there is no meaningful difference between this alternative and alternative 2 relative to cumulative effects.

4.3.3.2. Wildlife Habitat Enhancement

The proposed action described in Alternative 3 would be similar to those in Alternative 2 except there would be an additional 14 acres of treatment. There would be no alterations in water quality conditions and basin hydrology including stream flow and channel condition.

No cumulative effects are anticipated from the project action.

4.3.3.3. Road Decommissioning

Short-Term Effects

Alternative 3 is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the ACS (also see Appendix 5).

Alternative 3 would result in approximately 4.7 acres of ground disturbance from decommissioning approximately 2.4 miles of road. This would result in a small, short-term increase in sediment and stream turbidity. Most of this increase would occur during the first fall storm and should return to near background (natural) levels within two or three years. Most sediment coming off the roads would be effectively filtered by the forest floor because roads are located on ridgetops and benches away from drainages.

There would be a net reduction in 2 **d** miles of road mileage. Decommissioning roads would improve their hydrologic function by increasing soil infiltration, reducing runoff, encouraging vegetation recovery, and helping to restore the natural drainage patterns.

Removal of the 3 culverts (1-42"culvert on a perennial stream on the BLM 1-4-6.1 road and 2- 18" culvert on an ephemeral stream on the BLM 1-5-3.1 road) will likely result in some localized, short-term increases in sediment and stream turbidity. The culverts are not currently being maintained. Unless they are replaced or removed, they are likely to fail eventually, potentially resulting in a large load of sediment into the streams.

Long-Term and Commutative Effects

Over the long-term, and dependant on funding, Alternative 3 should improve the watershed condition by increasing infiltration and reducing road related water and sediment runoff on approximately 2.4 miles of roads.

No cumulative effects are anticipated from actions from this alternative because effects would be

expected to be small, short-termed, and limited in space. About 80%of the 2.4 miles of road proposed for treatment occur within 7,310 acre size watershed (Sain Creek) where there are about 66 miles of road.

References

Miller, R.E., Scott, W., Hazard, J.W. Soil Compaction and conifer growth after tractor yarding at three coastal Washington locations. 1996. Canadian Journal of Forestry. pp. 225-236.

U.S.D.A., Soil Conservation Service. 1982. Soil Survey of Washington County, Oregon

4.4. Vegetation

4.4.1. Special Status and Noxious Weed

4.4.1.1. Alternative 1 (no action)

No adverse impacts to the S&M species found in these units would be expected to occur under this alternative. None of the species found are restricted to a single ecological condition and so are not dependant upon management of forest stands to maintain their habitat.

Since there are no ground disturbing or light increasing actions associated with this alternative, weed populations are expected to decline or at least remain stable.

4.4.1.2 Alternative 2

Density Management and Watershed Restoration

Groundbase yarding can be expected to disturb the litter layer, soil, and woody debris to a greater extent than would cable yarding. Because most S&M species found grow in those substrates, they could be negatively impacted. The project design features (section 2.3.1.2) should be sufficient to protect S&M sites from adverse impacts.

Buxbaumia sp. is dependent on shade and a supply of moist logs in an advanced state of decay. With adequate buffering to known sites, removal of trees associated with this project should not alter microclimates for *Buxbaumia*. Proposed project activities for Scoggins Creek Project Area do not threaten species viability.

Helvella maculata produces solitary to gregarious sporocarps in a wide variety of habitats including suburban habitats and rotation age conifer stands. Although this is a category B species, the Management Recommendations for S&M fungi Sept 1997 states, “this taxa does not appear to be in need of special protection beyond that provided by the Northwest Forest Plan and the prospects

of sustained habitat viability are excellent (group 25-8). The Proposed project activities do not threaten the species viability.

Peltigera pacifica: Found on substrates of soil, moss, logs, and tree bases. With adequate buffering to known sites, removal of trees associated with this project should not alter microclimates. The Proposed project activities do not threaten the species viability.

No appreciable increase in the noxious weed / invasive exotics identified during the field surveys is expected to occur. Within the thinning units, any increase that does occur should be mostly confined to road corridors and would be expected to decrease over time as native species re-vegetate.

Decommissioning of roads should have no additional effect to S&M species

Wildlife Habitat Enhancement

The proposed projects and associated design features should be sufficient to protect S&M sites from adverse impacts.

4.4.1.3 Alternative 3

Density Management and Watershed Restoration

Impacts to the litter layer, soil, and woody debris could be expected. Because all S&M species found grow in those substrates, they could be negatively impacted. Helicopter yarding should provide a lesser amount of ground disturbance than Groundbase or cable yarding and thus be least detrimental for the S&M species encountered. Proposed recommendations should be sufficient to protect S&M sites from adverse impacts.

The effects on noxious weeds should be the same as in Alternative 2.

Wildlife Habitat Enhancement

The proposed projects and associated design features should be sufficient to protect S&M sites from adverse impacts.

4.4.2 Forest/Riparian

4.4.2.1. Alternative 1.

Density Management

The effects of not implementing density management at this time are described in detail in APPENDIX 2.

Watershed Restoration

The health and vigor of the forest vegetation would continue as described in APPENDIX 2.

Wildlife Habitat Enhancement

The forest stands would continue to grow and develop without management intervention. The development of some features of late-seral stage habitat would be expected to occur in a slower time frame than with the implementation of the wildlife habitat enhancement projects.

4.4.2.2. Alternative 2.

Density Management

The density management treatment would not impact any stands which have been identified as currently exhibiting LSF characteristics and mapped to meet the 15% retention S&G. For a detailed discussion of the environmental consequences relative to the Forest resource within both the AMA and RR land use allocation, please refer to APPENDIX 2.

Watershed Restoration

Road decommissioning using a winged sub-soiler would cause injury to the residual tree roots of those trees that come in direct contact with the sub-soiler. The longterm effects of subsoiling on tree health is unknown, but is thought to be minimal as long as a tree does not have too many of it's roots severed. Since the subsoiling would only occur on one side of the tree, it is unlikely that trees would actually be killed. Damage to tree roots can make a tree more susceptible to attack from bark beetles, in isolated cased this may occur. Because the forest canopy would change relatively little with the proposed road decomissioning there would not be anticipated differences in tree growth or regeneration. The removal of culverts would not directly effect the forest vegetation.

Wildlife Habitat Enhancement

The effects of the wildlife habitat enhancement projects on forest vegetation are detailed in Appendix 7.

4.4.2.3. Alternative 3.

Density Management

The density management treatment would not impact any stands which have been identified as currently exhibiting LSF characteristics and mapped to meet the 15% retention S&G. For a discussion on the environmental consequences relative to the Forest resource within both the AMA and RR land use allocation, refer to APPENDIX 2.

Watershed Restoration

Road decommissioning using a winged sub-soiler would cause injury to the residual tree roots of those trees that come in direct contact with the sub-soiler. The longterm effects of subsoiling on tree health is unknown, but is thought to be minimal as long as a tree does not have too many of it's roots severed. . Since the subsoiling would only occur on one side of the tree, it is unlikely

that trees would actually be killed. Damage to tree roots can make a tree more susceptible to attack from bark beetles, in isolated cased this may occur. The minimal affect that would occur to the forest vegetation would be slightly less than that in Alternative 2, because less road would be decomissioned. Because the forest canopy would change relatively little with the proposed road decomissioning there would not be anticipated differences in tree growth or regeneration. The removal of culverts would not directly effect the forest vegetation.

Wildlife Habitat Enhancement

The effects of the wildlife habitat enhancement projects on forest vegetation are detailed in Appendix 7.

4.5. Wildlife

4.5.1. Alternative 1 (no action)

Under this alternative no forest management activities would occur within the proposed project areas at this time and the forest stands would continue to grow and develop without management intervention. Under the "No Action" Alternative, the identified impacts of the action alternatives would not occur at this site at this time.

The expected benefits from density management treatment, watershed restoration and wildlife habitat enhancement projects to attaining the ACS objectives and the development of some features of late-seral stage habitat would be expected to occur in a slower time frame, as the untreated stands continue to develop naturally.

Selection of the "No Action" Alternative would be of *NO EFFECT* upon the marbled murrelet, spotted owl, bald eagle and all other species listed under the ESA. In addition, it would be expected to maintain the wildife S&M species at the site, it would not be expected to adversely impact (result in a loss in population viability or elevate their status to any higher level of concern) any of the wildlife S&M, Special Status, or other Species of Concern discussed in section 3.5

There are no adverse cumulative effects expected to result from the no action alternative for the species of concern which utilize late-seral habitat. Please refer to Appendix 7, page 42 for a full disclosure of cumulative effects.

4.5.2. Alternative 2 (proposed action)

Density Management

In general, the density project has been designed to promote the long-term development of late-seral stage habitat while minimizing or mitigating expected short-term adverse impacts. The project is primarily intended to increase the average tree diameter, increase the growing space dedicated to crown and limb development, and enhance the existing tree species diversity. Density

management thinning would greatly increase the rate at which these younger stands developed larger, more windfirm, overstory trees. Understory development is expected to be increased. Within the overstory, density management would tend to increase the tree canopy size and the size of individual limbs. Larger individual trees would eventually develop into larger size snags and down wood, both of which appear to be lacking in the more recent decay classes. Several small root rot pockets would be planted using tree species resistant to the laminated root disease.

While project design features to minimize the potential for adverse impacts to existing CWD have been included, it is expected that the majority of small snags within the treatment units will be knocked over during yarding or felled for reasons of safety; the substrate of some of the larger, decay class 3, 4 and 5 logs will be damaged during yarding. To offset these expected adverse impacts, project-wide and unit specific mitigation measures addressing CWD objectives have been designed considering a number of factors including the following: stand data, including existing CWD levels and mean tree diameter; existing levels of *P. weirri* root rot; proposed yarding system; and the proximity of the density management unit to wildlife habitat enhancement units. Incorportated mitigation measures include retaining a portion of the larger green reserve trees felled in cable yarding corridors; snag and CWD creation in low density patches in unit 9-1; snag creation in unit 3-2; retaining large trees with deformities at least in proportion to their occurrence in the stand in all units; retaining all trees greater than 20 inches DBH in all units; maintaining live tree stocking levels which allow for growing larger trees as a source of future CWD, more rapidly; and retaining no-cut buffers on streams and other unthinned patches in units 5-1 and 9-1 to allow for suppression mortality as well as meet other management objectives.

Species listed or proposed under the Endangered Species Act:

In accordance with regulations pursuant to Section 7 of the Endangered Species Act of 1973, as amended, formal consultation with the USFWS concerning the potential impacts of implementing Alternative 2 of the Scoggins Creek project upon the spotted owl, marbled murrelet and bald eagle would be completed. This would most likely be accomplished by including the Scoggins Creek project within the annual programmatic habitat modification biological assessment prepared by the interagency Level 1 Team (terrestrial subgroup) for the North Coast Province, rather than with the preparation of a project site-specific Biological Assessment.

Northern Spotted Owl - (FT)
The project area is not located in or near spotted owl designated critical habitat therefore, the proposed project would be of *"NO EFFECT"* upon spotted owl designated critical habitat.

The majority of the proposed density management treatment units including the roads to be constructed, reconstructed and/or decommissioned, as well as portions of the haul routes are within 0.25 miles of suitable spotted owl habitat which is currently unsurveyed. Although there are no known occupied sites within the vicinity of the proposed project, alternative 2 would be expect to result in the generation of noise above the ambient level with 0.25 miles of this suitable owl habitat during the critical and non-critical breeding periods.

Of the forest lands within the Dairy Creek 5th Field watershed which include all ownerships, roughly 10% is considered suitable habitat for the spotted owl (based only on a stand age of 80-years-old or older) while a total of approximately 74% (including the 10% suitable) is of an age and condition to function as dispersal habitat. Approximately 17% of the BLM land within the watershed, or approximately 640 acres, is considered to be suitable owl habitat. This is based upon a GIS sort of the timber database primarily identifying forest stands which contain at least a 1 bar stocking conifer component which is greater than or equal to 80-years-old. Approximately 97% of the BLM land within the watershed (3,668 acres) is in a condition to function as dispersal habitat.

Approximately 544 acres of spotted owl dispersal habitat are proposed for density management under Alternative 2. While there are some potential short-term adverse impacts to the dispersal habitat proposed for thinning, these acres are expected to continue to function as dispersal habitat post-harvest. This is based upon the fact that the average post-harvest canopy closure is expected to be greater than 40%; it is expected to be approximately 50%. While small openings, patch-cuts, roads, clearings and landings may result in isolated portions of the thinning treatment areas having a post-treatment canopy closure of less than 40%, the portions of the project area being proposed for thinning as a whole are not expected to be removed from a condition to function as spotted owl dispersal habitat.

Aside from the attention to canopy closure, the project incorporates other design features to minimize or mitigate the potential for adverse impacts and to promote the development of late-seral stage habitat within the treated stands. Some of these design features include the retention and creation of CWD (both snags and down logs); retention of hardwoods, large trees and trees determined to have features desirable to wildlife; clumps and gaps in the distribution of the retained overstory trees; and as appropriate, reforestation of landings, cable corridors, created gaps and/or areas infected by *Phellinus weirri*.

The proposed thinning is expected to result in increased or maintained growth rates of the understory conifer and shrub species as well as the trees retained within the overstory. This would result in the development of some features of spotted owl suitable habitat earlier than would occur without treatment. These features include large trees within the overstory which would be potential sources of future snags and down logs, and generally a more diverse and/or complex vertical and horizontal stand structure.

With approximately 74% of the forest lands (all ownership) and approximately 97% of the BLM land within the watershed being in a condition to function as dispersal habitat, it has been determined that adequate dispersal habitat would be present post-harvest to facilitate owl dispersal.

Alternative 2 *MAY AFFECT* and is *LIKELY TO ADVERSELY AFFECT* the spotted owl based upon the fact that it would result in an increased potential for disturbance of unsurveyed suitable habitat during the critical and non-critical breeding periods, and approximately 544 acres of dispersal habitat would be impacted although it is not expected to be removed from a condition to facilitate owl dispersal.

Marbled Murrelet - (FT)
The project area is not located in or near murrelet designated critical habitat therefore it would have *NO EFFECT* upon marbled murrelet designated critical habitat.

Three proposed treatment units (3-1, 3-2 and 15-2) contain, or are in proximity to and contiguous with stands which contain, individual trees and/or small groups of trees which are potentially suitable as murrelet nest trees based upon the presence of suitable nesting platforms. All of these potentially suitable as murrelet nest trees were surveyed to protocol in 2000; protocol surveys are scheduled to be completed in 2001. As per the NWFP (pg. C-10) and RMP (pg. 32), if surveys determine these stands of potential habitat to be occupied by murrelets, all contiguous existing and recruitment habitat within a 0.5 mile radius would be protected. There is no additional potential marbled murrelet habitat identified within or near (within 0.25 miles) any of the other proposed treatment areas.

One additional clump of approximately six larger trees that are scattered within a stand of Douglas-fir approximately 50 to 60 years old has been identified directly adjacent to a portion of the haul route. Some of these trees which are located on private land, may contain potential murrelet nesting platforms; they will not be surveyed. They are located along the lower 1.5 miles of the private Stimpson Mainline Road which is a two-lane, graveled major haul route which accesses a large block of industrial forest land. This road receives a considerable amount of traffic in order to support logging operations. Implementation of that portion of the Scoggins Creek project which is accessed by the Stimpson Mainline Road is expected to result in approximately 1,000 loads of logs being removed; at least half of these loads, those yarded with a grounded based yarding system, would be expected to be hauled during portions of the critical and non-critical murrelet breeding periods. Given there is an appreciable amount of disturbance within the general area of the Scoggins Creek project as a result of the logging activities on ODF and private industrial forest lands, especially along arterial haul routes such as the lower end of the Stimpson Mainline Road, hauling activities associated with the Scoggins Creek Project are not expected to raise the ambient noise level along that portion of the haul route that is adjacent to the small stand of trees discussed above.

The project does not include daily time restrictions (two hours after sunrise to two hours before sunset) based upon the fact than all suitable murrelet habitat within 0.25 miles of the treatment units would be surveyed, and hauling is not expected to raise the ambient noise level along that portion of the Stimpson Mainline haul route which is adjacent to a small clump of trees that may contain potentially suitable nesting platforms.

No potentially suitable murrelet nest trees will be felled as a part of the Scoggins Creek project and no openings would be created within one tree length surrounding a potential murrelet nest tree. However, thinning in the vicinity of these potentially suitable nest trees will change the current and future character of the treated stands. This may have some impact (beneficial or adverse) upon the likelihood that at some point in the future these trees are used successfully by murrelets for nesting.

As discussed above relative to the promotion of suitable spotted owl habitat, the Scoggins Creek project is expected to result in the development of some features of marbled murrelet suitable habitat earlier than would occur without treatment. These features include large trees within the overstory with platforms suitable for murrelet nesting and generally a more diverse stand structure within the areas treated.

Alternative 2 *MAY AFFECT* and is *LIKELY TO ADVERSELY AFFECT* the marbled murrelet based primarily upon the fact that thinning would occur within three treatment units which are in the vicinity of surveyed potentially suitable marbled murrelet nest trees.

Bald Eagle - (FT)
No recent eagle sightings have been recorded within or near the proposed treatment areas. The nearest known bald eagle nest is approximately 2 miles from the proposed action.

One of the proposed treatment units (15-2), has been determined to be adjacent to a patch of suitable habitat for bald eagles. This habitat is probably best suited for roosting and resting rather than nesting based upon the general lack of suitable nest trees and the fact that the coho salmon and steelhead trout runs within the area are quite depressed. No eagles or eagle nests have been observed in this patch of suitable eagle habitat.

There is no additional identified eagle habitat within or near any of the other proposed action areas, although it is possible that a limited number of unidentified scattered individual trees or small groups of trees which are suitable for roosting or resting may be located near some of the treatment units or along portions of the various haul routes.

The potential dates of operation for the proposed project are such that activities may occur which would generate noise above the ambient level during the eagle breeding season (January 1 to August 31). One unit (15-2) may be within 0.25 miles of suitable eagle habitat. This suitable habitat is currently not known to be used by eagles however, occasional dispersed eagle usage (roosting, resting) may occur throughout the area where suitable habitat is present.

It has been determined that Alternative 2 *MAY AFFECT, and NOT LIKELY TO ADVERSELY AFFECT* the bald eagle. This is primarily based upon an increased potential for disturbance during the breeding season as a result of logging unit 15-2, as well as potentially along portions of the various haul routes.

<u>Survey and Manage Wildlife Species (S&M)</u>

Red Tree Vole

Although the red tree vole is generally associated with much larger and older Douglas-fir trees than those found in the vicinity of the proposed action, the project area currently contains potential habitat for the red tree vole.

All of the proposed treatment units which require pre-project surveys have been surveyed to protocol for red tree voles; these surveys resulted in no red tree voles or red tree vole nests being located. *Survey Protocol for the Red Tree Vole* (Version 2.0) was followed for all surveys.

There would be some long-term benefits to the development of higher quality red tree vole habitat resulting from the effects of thinning within the 11 proposed treatment units which total approximately 544 acres. This is based upon the fact that the treatment is expected to maintain a post-harvest average canopy closure of approximately 50% and trees generally favored for retention would be the largest within the stand. The reserve trees are expected to respond to the thinning with an accelerated growth rate and increased crown development within a few years after the harvest. This would result in a higher quality of vole habitat within these units sooner than would be expected to develop without treatment. There are no expected short-term positive or negative impacts to the red tree vole resulting from the proposed thinning. This is based upon the fact that all action areas containing suitable habitat have been surveyed to protocol and found to be unoccupied by red tree voles.

S&M Mollusks

Survey and Manage mollusk surveys for the Scoggins Creek Project were conducted in and near all proposed density management units in the spring and fall of 2000. "*Survey Protocol for Terrestrial Mollusk Species from the Northwest Forest Plan*" (Draft Version 2.0, Oct. 29, 1997) was followed for all surveys.

As per the discussion in Section 3.5, pre-project Survey and Manage mollusk surveys resulted in no S&M mollusks being located.

Even though there are no S&M mollusk known sites within the density management project area, there are several project design features which help reduce the potential for short and longer term adverse impacts to S&M mollusks and/or their habitats throughout the general project areas. These additional design features include but are not limited to reserving all hardwoods; where appropriate, incorporating red alder and/or bigleaf maple into reforestation plantings including landings, cable corridors, created gaps and/or areas infected by *Phellinus weirri*; protecting and reserving existing CWD; minimizing disturbance to the existing organic duff layer by designating skid trails and minimizing the use of fire; and maintaining a post-harvest canopy closure which averages approximately 50%.

Even though measures are incorporated into the proposed action to minimize soil disturbance, it would not be totally eliminated. Within thinning units this usually results in red alder naturally seeding into areas with disturbed soil if a seed source is available; the proposed action is expected to result in an increased amount of alder growing within portions of the treatment units which would be expected to result in some benefit to the quality of future mollusk habitat within the treated stands.

Other Special Status Species of Wildlife:

Alternative 2 would not result in the loss of population viability for any Special Status Species that may occur in the project area, or result in the need to elevate their status to any higher level of concern including the need to list under the ESA.

Amphibians and Reptiles:

Columbia Torrent Salamander - (BS)
The Columbia torrent salamander is directly associated with the splash zone of permanently flowing streams and seeps. Suitable habitat is located within the riparian reserves located within and adjacent to the proposed units.

In general, the "no cut" riparian buffers would provide adequate protection to any Columbia torrent salamander habitat in the area. The yarding corridors needing to be created through the riparian areas would not be expected to appreciably reduce the quality of the habitat within these areas especially given the fact that full suspension would be required across the creeks, all trees needing to be cut within these buffers would be retained on site as CWD, and it would be expected that nearly full shade within the riparian area would rapidly recover as the retained and/or planted trees and brush species take advantage of the created openings.

Birds:

Northern Goshawk - (BS)
The proposed action is expected to have no, or a negligible short-term impact upon goshawks and goshawk habitat based upon the low likelihood of goshawks currently utilizing the area, the maintenance of the "no-cut buffers" within the riparian reserves, the light nature of the proposed thinning prescriptions, and the dispersed nature of the treatment units which are often intermingled with other areas not proposed for treatment.

The density management treatments would be expected to result in long-term benefits to goshawk habitat by maintaining or increasing the growth rates of reserve trees thus aiding the development of some late-seral stage habitat features.

Mammals:

Bats
There are no known bat roosting or hibernaculum sites within the project area.

Bats are known to forage near riparian areas, open areas, and along forest edges. The Scoggins Creek project would be expected to immediately improve the quality of bat foraging habitat within the density management units by opening up the canopy and creating small fragmented openings in an otherwise closed canopy. The project's design features for CWD, snag and green tree

protection and retention, including those trees with features desirable to species such as bats, should provide adequate structure for roosting or resting bats and greatly reduce any short- and/or long-term adverse impacts to bats which may result from the proposed project. Within the units proposed for thinning, there is potential for long-term benefits to these bats as a result of the proposed action based upon the fact that it would favor the development of some older forest characteristics favored by these species.

Other Species of Concern

Roosevelt Elk and Black-Tailed Deer

It is expected that implementation of the Scoggins Creek project would temporarily displace individual deer and elk as they react to an increased human presence within the vicinity of the treatment units. This would not impact the health of the population based upon the expected limited length of time of the disturbance and the fact that adequate additional suitable habitat is present within the vicinity of the proposed action.

The project would result in areas with an increased quality of browse and/or forage interspersed with areas of cover and overall, it would be expected to result in an improvement in the habitat quality available for elk and deer. This is generally based upon the basic configuration of the units, light nature of the proposed treatments and the proposal to obliterate many of the roads accessing the units at the completion of the harvest thereby resulting in a decrease of approximately 2 miles of road within the area. Within the density management treatment units, the vigor of the herb and shrub understory layers would be greatly increased thereby improving the quality of available browse and/or forage.

Although the proposed treatments could have a slight, adverse short-term impact upon escape and/or thermal cover for big game in portions of the thinned units, other suitable thermal and/or escape cover exists within the general area including within the no-cut buffers within riparian reserves and in the other intermingled areas not proposed for treatment. Areas which are thinned would continue to function, in some regard as cover for big game; forested stands should still serve to help moderate temperature and wind extremes as well as serve as a visual buffer. The project would not be expected to result in a short-term reduction of available cover to the point where it would be become a limiting factor, adversely impacting the population health of big game species. Additionally, thermal cover is probably less important or limiting within the Coast Range of northern Oregon than in other portions of these species' range, due to both the mild winters and summers within the region

Wildlife Habitat Enhancement

In accordance with regulations pursuant to Section 7 of the Endangered Species Act of 1973, as amended, formal and/or informal consultation with the USFWS concerning the potential impacts of the Scoggins Creek Wildlife Habitat Enhancement projects upon the spotted owl, marbled

murrelet and bald eagle would be completed where appropriate. This would most likely be accomplished by including the Scoggins Creek Wildlife Habitat Enhancement Projects within the annual programmatic habitat modification biological assessment prepared by the interagency Level 1 Team (terrestrial subgroup) for the North Coast Province, although some of the proposed treatments may require the preparation of a project site-specific Biological Assessment.

Spotted Owl and Marbled Murrelet Designated Critical Habitat - Since none of the proposed wildlife habitat enhancement projects are located within or near designated critical habitat for the spotted owl or the marbled murrelet, all of the projects would be of *NO EFFECT* upon designated critical habitat for the spotted owl or the marbled murrelet.

Northern Spotted Owl - (FT)
There are no known spotted owl sites within the vicinity of any of the proposed wildlife habitat enhancement project areas.

Alternative 2 proposes to treat a total of approximately 182 acres. Some of the proposed wildlife habitat enhancement units are considered to be marginally suitable for the spotted owl; those which are not currently considered to be suitable owl habitat are considered to be owl dispersal habitat. In addition, some of the areas identified for treatment are within 0.25 miles of unsurveyed suitable habitat for the spotted owl. The project has potential to create noise above the ambient level through the use of chainsaws, during the non-critical nesting season within 0.25 miles of unsurveyed suitable habitat.

Based upon the scale and nature of the proposed treatments, minimal adverse impact to spotted owl dispersal and suitable habitat is expected; no stand would be removed from its current condition to function as dispersal or suitable habitat. Some of the affected dispersal habitat is currently of a very poor quality, most notably portions of units W8-1 and W9-2, W9-3, based upon the extreme density of the stand. These dense portions of the treated stands would be treated with the release of individual and small groups of trees. This would be expect to benefit the quality of the dispersal habitat by opening portions of stand thereby facilitating an owls ability to movement through the treatment area. Other beneficial impacts resulting from the wildlife habitat enhancement projects include increasing the abundance of major constituent elements of spotted owl habitat in an area identified as generally lacking those elements - trees suitable for owl and prey base nesting, large conifers within mixed hardwood/conifer stands, and CWD (Coarse Woody Debris) in the form of both standing snags and down logs. The wildlife habitat enhancement project could likely afford (1) future nest trees for the owl (2) denning and/or foraging sites for prey species and (3) CWD which could be utilized by prey species and other special status species.

No tree which is currently, potentially suitable as a spotted owl nest tree nor any tree adjacent to a potentially suitable nest tree, would be affected.

Based upon the potential for disturbance resulting from the fact that chainsaws could be utilized after July 7 (within the non-critical owl nesting season), as well as any potential short-term impacts

and long-term potential beneficial impacts to spotted owl suitable and dispersal habitat, the project has been determined to *MAY AFFECT but NOT LIKELY TO ADVERSELY EFFECT* the spotted owl.

Marbled Murrelet - (FT)
There are no known marbled murrelet sites within the vicinity of any of the proposed wildlife habitat enhancement project areas. One of the proposed treatment units, W1-1, is within and adjacent to unsurveyed potential murrelet habitat. There is potential for increase disturbance to this habitat as a result of the use of chainsaws, as well as climbing into the canopy during the non-critical portion of the murrelet breeding season. Daily time restrictions would be utilized for work occurring on or prior to September 15.

Based upon the scale and nature of the proposed treatments, minimal adverse or beneficial impact to murrelet potential habitat is expected. No tree which is currently, potentially suitable as a murrelet nest tree nor any tree adjacent to a potential murrelet nest tree would be treated affected.

The wildlife enhancement project *MAY AFFECT but NOT LIKELY TO ADVERSELY AFFECT* the murrelet based primarily upon the potential for disturbance. This analysis also considers the potential for short and long-term potential adverse and beneficial impacts to murrelet potential habitat.

Bald Eagle - (FT)
The nearest known eagle nest is approximately 2 miles from the proposed project areas. Portions of one habitat enhancement unit, W1-1 is considered suitable habitat for the bald eagle although eagles are not known to utilize the area. Additional suitable habitat may also be within 0.25 miles of this unit or within 0.5 miles line-of-sight distance. The bald eagle breeding season is considered to be January 1 until August 31. The project has potential to create noise disturbance during portions of the breeding season (August 6 to August 31, and January 1 to March 1).

Based upon the scale and nature of the proposed treatments, no short or long-term adverse impacts to eagle habitat is expected. The creation of additional snags within this unit has the potential for longer-term beneficial impacts to the quality of eagle habitat within the area through providing an increased opportunity for roosting sites although this impact is considered minor.

Based primarily upon the potential for disturbance within portions of eagle breeding season (August 6 to August 31, and January 1 to March 1) to the suitable habitat within and near unit W1-1, the project *MAY EFFECT* although it is *NOT LIKELY TO ADVERSELY EFFECT* the bald eagle.

<u>Survey and Manage Wildlife Species (S&M)</u>

Red Tree Vole
Although the red tree vole is generally associated with much larger and older Douglas-fir trees than

those found in the vicinity of the proposed wildlife habitat enhancement projects, some portions of the project areas currently contain potential habitat for the red tree vole. In general this habitat is of a marginal quality based upon the stand age and average diameter of the trees.

The wildlife habitat enhancement treatments involve only the treatment of trees which do not contain any nests and are not adjacent to any trees which contain nests. Treatment units which are stocked with relatively larger trees such as W1-1, W3-1, W3-2, W5-1 and W9-1 do not involve the felling of trees rather the creation of snags or snag-topped live trees. Based upon the general fact that such a small percentage of available Douglas-firs within the stands would be treated and these trees would not contain nests or be adjacent to trees containing nests, the project would not impact the suitability of the treated stands for use by red tree voles. No red tree vole surveys will be conducted within these units per se, although a portion of these units may be surveyed in conjunction with an adjacent density management treatment unit.

S & M Mollusks
The proposed wildlife habitat enhancement project areas currently contain suitable habitat for S&M mollusks. However, based upon the various design features of the individual treatment units, as well as the nature of the habitat features to be impacted, only a portion of the wildlife habitat enhancement projects have been determined to be potentially "habitat altering" to the point of triggering the need for pre-project surveys. In some situations, where a wildlife habitat enhancement treatment unit is adjacent to a density management treatment unit, S&M mollusk surveys were conducted wholly or partially within the habitat enhancement unit even though the expected impacts of the wildlife habitat enhancement treatment was not believed to be of the nature to trigger the need to conduct pre-project surveys (see project record document #43). Units which were surveyed for S&M mollusks include W3-1, W3-2, W5-1, W8-1, and W9-1; no known sites were identified. No portion of Unit W1-1 was surveyed as the nature of the project is not expected to impact the suitability of the treated stands for use by S&M mollusks or disturb any habitat elements. No impact to S&M mollusk species is expected to result from the proposed projects.

Other Special Status Species:
No species identified under the Bureau's 6840 manual Special Status Species policy are expected to be adversely impacted by the wildlife habitat enhancement treatments resulting in the need to elevate their status to any higher level of concern including the need to list under the ESA.

CUMULATIVE EFFECTS

"Cumulative Effects" are the impacts on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time (CEQ 1508.7). Cumulative effects analysis provides greater insight into understanding the current environmental factors and the likely trends which might affect the

environment.

Relative to wildlife resources, the only issue identified within the *Upper Tualatin-Scoggins Watershed Analysis* (2000) with a likelihood for cumulative effects is related to factors affecting the distribution of sensitive species. There are no adverse cumulative effects expected to result from the no action or proposed action alternatives which are associated with the modification of habitat for the species of concern which utilize late-seral habitat. This is based upon the facts that the proposed density management projects would not take place within stands which are currently providing late-seral habitat; the proposed treatments would in fact, promote the development of late-seral habitat sooner than would occur without treatment. Similarly, the wildlife habitat enhancement projects are also designed to promote the development or enhance the quality of some late-seral habitat features. The density management treatments would not occur within spotted owl, marbled murrelet or bald eagle suitable habitat but rather would occur within stands which have been determined to be dispersal habitat for the spotted owl; the treated stands are expected to continue to be able to function as dispersal habitat post-harvest. There are no known historic or current spotted owl or marbled murrelet sites within the watershed.

Please refer to Appendix 7, page 42 for a full disclosure of cumulative effects

4.5.3. Alternative 3

Density Management

Under alternative 3, the positive and negative impacts associated with timber harvest upon wildlife and wildlife habitat would generally be the same as those discussed under Alternative 2. (Alternative 3 proposes density management of approximately 542 acres - 364 acres within the AMA land allocation and 178 acres within Riparian Reserves, while Alternative 2 proposes density management of approximately 544 acres - 385 acres within AMA and 159 acres within Riparian Reserves.) Notable exceptions in the general differences between the two action alternatives as it relates to wildlife habitat include the expected impact upon existing CWD; helicopter yarding would be expected to result in considerably less damage to the existing CWD than would occur under traditional ground based or cable yarding operations.

Species listed or proposed under the Endangered Species Act:

In accordance with regulations pursuant to Section 7 of the Endangered Species Act of 1973, as amended, formal consultation with the USFWS concerning the potential impacts of implementing Alternative 3 of the Scoggins Creek project upon the spotted owl, marbled murrelet and bald eagle would be completed. This would most likely be accomplished by including the Scoggins Creek project within the annual programmatic habitat modification biological assessment prepared by the interagency Level 1 Team (terrestrial subgroup) for the North Coast Province, rather than with the preparation of a project site-specific Biological Assessment.

Northern Spotted Owl - Federally Threatened (FT)
Alternative 3 would effectively result in an equal amount of spotted owl dispersal habitat being treated with a density management thinning operation as under Alternative 2. Consequently, under this alternative, the positive and negative impacts associated with habitat modification upon the northern spotted owl would be similar as the impacts discussed for Alternative 2.

Unsurveyed suitable owl habitat is located within 0.25 miles of the proposed treatment units. Alternative 3 would result in landing construction and decomissioning occurring in seasons of low soil moisture; this would include portions of the critical and non-critical breeding periods. No helicopter yarding would occur between March 1 and July 7 (the critical nesting period however it may occur between July 8 and September 30 (the non-critical nesting period).

Alternative 3 *MAY AFFECT* and is *LIKELY TO ADVERSELY AFFECT* the spotted owl based primarily upon the fact that there would be an increased potential for disturbance of unsurveyed suitable habitat during the critical and non-critical breeding periods. In addition, approximately 542 acres of dispersal habitat would be treated with a density management treatment resulting in both positive and negative impacts, although the areas are still expected to function for owl dispersal post-harvest based on the maintenance of a canopy closure that is expected to be approximately 50%.

Marbled Murrelet - (FT)
The potential impacts to the marbled murrelet resulting from habitat modification would basically be the same under Alternative 3 as were discussed under Alternative 2. This is based upon the fact that the three proposed treatment units (3-1, 3-2, 15-2) that contain or are in proximity to potentially suitable murrelet nest trees would receive the same treatment as proposed under Alternative 2.

Like alternative 2, the design features for alternative 3 allow for the yarding and hauling of logs during portions of the critical and non-critical murrelet breeding periods. No helicopter yarding would occur between March 1 and July 7. Between July 8 and August 5, yarding flight paths would be designed to avoid areas containing unsurveyed potential murrelet habitat by at least 0.25 miles; flight paths would not be designed to avoid areas of surveyed potential habitat. All helicopter yarding which occurs between August 6 and September 15 and takes place within 0.25 miles of unsurveyed potential murrelet habitat would not begin until two hours after sunrise and would end two hours before sunset; use of the designated flight paths between August 6 and September 15 would avoid the necessity for daily time restrictions.

Alternative 3 *MAY AFFECT* and is *LIKELY TO ADVERSELY AFFECT* the marbled murrelet based upon the fact that although daily time restrictions would be observed, there would be an increased potential for disturbance of unsurveyed suitable habitat as a result of helicopter yarding during the non-critical breeding periods, and thinning would occur within three treatment units (3-1, 3-2, 15-2) which are in the vicinity of surveyed potentially suitable marbled murrelet nest trees.

Bald Eagle - (FT)
The potential impacts to the bald eagle would basically be the same under Alternative 3 as were discussed under Alternative 2. This is based upon the fact that one of the proposed treatment units (15-2) is adjacent to a patch of potentially suitable eagle roosting and resting habitat. No eagles or eagle nests have been observed in this patch of suitable eagle habitat. Helicopter yarding activities between July 8 and February 29, would be expected to disturb this patch of eagle habitat. Portions of this period of potential disturbance include portions of the eagle breeding season which is January 1 to August 31.

It has been determined that Alternative 3 *MAY AFFECT, and is NOT LIKELY TO ADVERSELY AFFECT* the bald eagle. This is primarily based upon the fact that the alternative includes an increased potential for disturbance during the breeding season within 0.25 miles, or within a 0.5 mile line-of-sight distance, of marginally suitable roosting and resting habitat.

Survey and Manage Wildlife Species, Special Status Species or Other Species of Concern
Under alternative 3, the positive and negative impacts associated with timber harvest upon Survey and Manage Wildlife Species, Special Status Species or Other Species of Concern would generally be the same as those discussed under Alternative 2. A possible exception is the expected impact to existing CWD; helicopter yarding would be expected to result in considerably less damage to the existing CWD than would occur under traditional ground based or cable yarding operations. This would be beneficial to species which utilize CWD such as clouded salamanders and pileated woodpeckers both Bureau tracking species, as well as S&M mollusks.

Wildlife Habitat Enhancement

Under this alternative, the positive and negative impacts associated with wildlife habitat enhancement upon species proposed or listed under the ESA, Survey and Manage Wildlife Species, or Special Status Species would generally be increased proportionately from the impacts discussed for Alternative 2 to reflect the increase in treatment under alternative 3. The differences in these acres are displayed on table 4.

CUMULATIVE EFFECTS

The cumulative effects of Alternative 3 are not expected to differ from those of Alternative 2. Please refer to Appendix 7, page 42 for a full disclosure of Cumulative Effects

4.6. Fisheries

4.6.1. Alternative 1 (no action)

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the

environmental effects of this alternative, including any interrelated or interdependent actions, on relevant indicators. Refer to Appendix 5, for a discussion of the alternatives relative to the Aquatic Conservation Strategy Objectives.

Timber Harvest, Road Management, Watershed Restoration: No action would occur under Alternative 1, therefore no direct effects would occur to fish or fish habitat. The potential adverse impacts to impacts to fish and aquatic habitat that could occur if any of the action alternatives were implemented would be avoided, however a net decrease in road mileage, which would result in an indirect beneficial effect to fish and aquatic habitat in the long term would also not occur. The road segments identified would not be stabilized, possibly resulting in sediment mobilization into streams. Though it is likely that the majority of the sediment that would move has done so already, there is a possibility of continued erosion during wet periods that could move sediment into the Upper Tualatin- Scoggins Watershed. The affect call for both Upper Willamette steelhead and chinook as well as designated critical habitat for both of these species would be **No Effect**

As all populations of chinook are covered by the Magnuson-Stevens Act in this watershed a discussion of effects to their Essential Fish Habitat (EFH) both present and historic is warranted. While fall chinook are not native to the above Willamette Falls, spring chinook were known to use Gales Creek to the North. Only one observation of adult chinook has been made in this watershed at a fish trap in Scoggins Creek in the 1970s and they were considered strays. As Upper Willamette chinook salmon are federally listed as threatened under the Endangered Species Act (ESA) and the impacts are expected to be the same to EFH this action is expected to have ***No Adverse impact*** to EFH. Coho are present in this watershed and are also covered by the Magnuson-Stevens Act, the known distribution of these naturally producing introduced coho are well downstream of the project areas and as such ***No Adverse impact*** to coho EFH is expected

Wildlife Projects: No direct or indirect effects would occur to fish or fish habitat in the Upper Tualatin- Scoggins watershed. The affect call for both Upper Willamette steelhead and chinook as well as designated critical habitat for both of these species would be **No Effect**. Since the wildlife projects are restoration and enhancement projects, indirect adverse impacts may result from not implementing them, though any short-term adverse impact would also be avoided. However, many riparian areas within the Upper Tualatin watershed lack conifers or they are currently very young for future input of large wood. In the long-term, if the wildlife habitat enhancement project is not implemented and the current limited amount of large wood decomposes there will be little snag habitat or short term improvements for wildlife species that use snags or CWD. The wildlife habitat enhancement project is not expected to adversely impact fish or aquatic habitat, therefore not implementing this project would not be expected to have any indirect adverse impacts on fish and aquatic resources.

As Upper Willamette chinook salmon are federally listed as threatened under the Endangered Species Act (ESA) and the impacts are expected to be the same to EFH this action is expected to have ***No Adverse impact*** to EFH. Due to the distance downstream of coho habitat there is no

potential of adverse impacts from this action ***No Adverse impact*** to coho EFH is expected.

Cumulative Effects (Upper Tualatin Watershed): The *Upper Tualatin - Scoggins Watershed Analysis*, (BLM 2000), identified increased sedimentation and decreased large woody debris inputs as the major factors affecting salmonid habitat within the Upper Tualatin watershed. Salmonid habitat, especially in the mainstems, is generally limited in the Tualatin Plain, and used mainly as migration corridors. The Tualatin Mountain portions of the drainage provide some quality salmonid habitat, however much of the habitat has been diminished due to past land management actions. An estimated 11 miles of stream in the Upper Tualatin watershed are on the ODEQ (Oregon Department of Environmental Quality) water quality limited list. Water quality problems include excessive *E. coli* counts and low dissolved oxygen. Numbers of Upper Willamette steelhead spawners have had a steep and continuing decline since 1988. The decline has been attributed mainly to destruction and modification of habitat, overutilization for recreational purposes, and natural and human-made factors (Federal Register: March 10, 1998, Vol. 63, No. 46, Proposed Rules, pp. 11797-11809). Though cutthroat trout are described as relatively abundant, it is likely that they are experiencing a downward trend for the same reasons as steelhead. Trends for other fish species within the watershed are mostly unknown, but are suspected to be downward given the habitat limitations described above.

If the none of the action alternatives are implemented, potential adverse impacts would be avoided, however they are not expected to contribute to downward trends in fish populations. The beneficial effects of reducing road mileage within the watershed, and improving wildlife habitat in both riparian and upland areas would not occur, though the overall beneficial impacts to the watershed are relatively minor and are not expected to substantially affect overall trends in fish populations.

4.6.2. Alternative 2 (proposed action)

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental effects of this alternative, including any interrelated or interdependent actions, on relevant indicators. Refer to Appendix 5 for a discussion of the alternatives relative to the Aquatic Conservation Strategy Objectives.

Timber Harvest, Road Management, Watershed Restoration: This alternative could result in sediment delivery to streams as a result of road building and decommissioning, yarding of logs and transporting logs, which could lead to indirect effects to fish and fish habitat. Timber harvest activities are not expected to occur during the winter, when there is the highest potential of sediment moving into streams. Potential impacts to aquatic habitat include turbidity and sediment above existing conditions. No measurable change to either fish or fish habitat is anticipated. Impacts to fish above Hagg Lake may involve suspension of feeding, or an aversion response, but not the loss of individuals from the population. Due to the steep nature of these stream segments and the amount of LWD present, loss of primary habitat elements (i.e. pools, clean gravels) is unlikely.

The project includes the following actions which would minimize or eliminate sediment movement into streams: decommissioning of roads for a 18,250 foot net decrease in road mileage, decompacting landings and planting after use, rocking roads used during the wet season to avoid sediment run-off, no-cut buffers along both fish bearing and non-fish bearing streams, no ground-based yarding equipment or skid trails allowed within Riparian Reserves, utilize existing skid trails to the greatest extent possible, limiting the number and width of new skid trails and cable yarding corridors, and restrict ground-based yarding to periods of low soil moisture (generally from July 1 through October 31). Log hauling and road building/decommissioning activities may result in short term increases in turbidity, but there should not be long term changes in stream sediment levels.

The increases in sediment/turbidity are not anticipated to affect habitat quality for other fish species because stream gradients and current large wood should maintain habitat components through time. Any short term unmeasurable increase in sediment or turbidity has little chance of changing the usefulness of any of the habitat features as the major habitat forming elements (i.e. LWD, slope) will be maintained.

It is probable that limited quantities of sediment will enter the streams during ground disturbing activities and hauling of logs. However, because the reservoir at Henry Hagg lake is so large, there should not be any sediment or turbidity reaching listed fish downstream of the dam. Timber harvest and hauling on the ridge top road that straddles the Lee Creek Drainage and tributaries that drain into Henry Hagg Lake will be limited to dry season use, spot rocking and sediment retention structures in all ditch lines with hydrologic ties to steam channels.

If Alternative 2 was implemented, the ESA call for listed Upper Willamette steelhead trout and Upper Willamette chinook salmon, would be **"No Effect"** due to the large reservoir, the distance to habitat and the mitigation measures employed.

The call for designated critical habitat for Upper Willamette steelhead trout and Upper Willamette chinook salmon would be **"No Effect"** as areas above the dam that form Henry Hagg Lake are not considered to be designated critical habitat as *(per Email Ron Lindland 08/02/01). Critical habitat ends at Haines Falls an anadromous barrier on Lee Creek, and outside the project area on the Upper Tualatin River.

As Upper Willamette chinook salmon are federally listed as threatened under the Endangered Species Act (ESA), and the impacts are expected to be the same to EFH, this action is expected to have ***No Adverse impact*** to EFH. Due to the distance downstream of coho habitat and no potential of adverse impacts from this action ***No Adverse impact*** to coho EFH is expected.

The design features incorporated into the project make adverse impacts to other fish species found within the Upper Tualatin-Scoggins drainage a low probability as the elements that make and maintain quality habitat are present in these stream reaches.

Wildlife Habitat Enhancement: About half of the approximately 180 acres included in the wildlife habitat enhancement project would be in RR. Design features built into this project include no trees adjacent to streams would be felled if there would be a reduction in shading of the stream. Because there is no potential for impacts to listed fish species, the ESA call would be "**No Effect**" Upper Willamette steelhead trout and Upper Willamette chinook salmon. There would be "**No Effect**"on designated critical habitat for Upper Willamette steelhead trout and Upper Willamette chinook salmon. This project would not negatively impact fish, other aquatic species or aquatic habitat, nor reduce population viability of any fish species within the Upper Tualatin-Scoggins watershed. As Upper Willamette chinook salmon are federally listed as threatened under the Endangered Species Act (ESA) and the impacts are expected to be the same to EFH this action is expected to have ***No Adverse impact*** to EFH

Cumulative Effects (Upper Tualatin Watershed): The trends for fish species in the Upper Tualatin-Scoggins watershed are the same as described under the Alternative 1. Future management actions on BLM land will be in accordance with the Salem RMP which contains management direction to maintain or restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems, and to maintain or enhance fisheries potential. Since only 4.5% of the watershed is owned by the BLM, any action taken on federal land will have minimal impact on fish species and their habitats within the watershed. The BLM will likely pursue cooperative efforts with the Tualatin Watershed Council, private landowners and others to implement instream habitat improvements, which would lead to some improvement in aquatic habitat conditions throughout the watershed. In addition, the *Oregon Plan for Salmon and Watersheds* should lead to some improvement in aquatic habitat, though to what extent is unknown as this is a largely volunteer effort. If Alternative 2 were implemented there would be potential short term adverse impacts from timber harvest activities (hauling, road building, road decomissioning) and also long-term beneficial effects from a reduction in road mileage and wildlife treatments to riparian and upland areas. These potential impacts as noted above are relegated to the areas above Henry Hagg Lake. Neither the potential adverse impacts or the beneficial effects are anticipated to alter the long-term viability of fish species at either the watershed or project scale in the Upper Tualatin watershed.

In 1993, 1994, and 1997, the Department of Fish and Wildlife (ODFW) conducted stream surveys on the upper 9.4 miles of Sain Creek. They found that the reach is fairly well shaded (a mean of 84.3%, helping keep water temperatures cool), and fair amount of large woody debris (49 key pieces per mile). Aerial photos show that most of the riparian areas along the reach are greater than 25 feet in width and are dominated by a mix of hardwoods and conifers. ODFW data show that the mean stream bank erosion was 13%. For riffle habitat, channel substrates have 7.5% organic, 11.3% sand, 32.7% gravel, 25.8% cobble, 18.8% boulder and 3.9% bedrock.

Based upon ODFW stream surveys and observations and inferences, project area streams are in relatively good condition for most part, aquatic habitat indicators including large woody debris, streambank condition, streamside shade, and pool frequency are properly or near properly functioning, better than most regional streams. However, the high portion of fines found in Sain Creek seem to indicate that sediment delivery rates have been or are currently higher than under

normal natural conditions. High sediment loads could be harming the stream ecology in the project area and may potentially be reducing the useful life of Hagg Lake.

See 3.4.3.2.1 for a discussion of the potential water quality impacts.

4.6.3. Alternative 3

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental effects of this alternative, including any interrelated or interdependent actions, on relevant indicators. Refer to Appendix 5 for a discussion of the alternatives relative to the Aquatic Conservation Strategy Objectives.

Timber Harvest, Road Management, Watershed Restoration:: Impacts to fish, other aquatic species and aquatic habitat would be similar to those described under Alternative 2 for the hauling of harvested trees. Other potential impacts described in Alternative 2 would be virtually eliminated. Design features of this alternative that further minimize impacts as compared to Alternative 2 include greatly reduced road building, no use of ground-based harvest, more riparian reserve treated (about 16 acres more). Less activity during wet periods of the year will help reduce amount of sediment that could move into streams. Use of helicopter harvest in harvest areas will help reduce the amount of compacted soil, which will help maintain subsurface flow of water and reduce potential for increased surface runoff and associated sedimentation. The affect call for both Upper Willamette steelhead and chinook would be "***No Effect"*** for the reasons stated above. As Upper Willamette chinook salmon are federally listed as threatened under the Endangered Species Act (ESA) and the impacts are expected to be the same to EFH this action is expected to have ***No Adverse impact*** to EFH. Due to the distance downstream of coho habitat and no potential of adverse impacts from this action ***No Adverse impact*** to coho EFH is expected.

Road decommissioning would likely occur at a different time frame than the timber sale. Because many of the roads would not be used during the timber harvest none of the potential impacts of road use (hauling logs) are anticipated. The short term impacts of road decommissioning include some sediment mobilization and stream turbidity. The benefits associated with this action include an improvement of soil infiltration which reduces runoff and a long term reduction in road related sediment thereby improving hydrologic function a benefit to some of the ACS and Matrix (appendix 5 and 6) indicators. As in Alternative 2 the approximately 2.4 miles of roads to be decommissioned are located above Henry Hagg Lake or on a ridge top location without hydrologic ties to stream channels precluding sediment or turbidity from reaching Upper Willamette steelhead, Upper Willamette chinook or the critical habitat for either of these species. The affect call for both Upper Willamette steelhead and chinook would be "***No Effect"*** for the reasons stated above. As Upper Willamette chinook salmon are federally listed as threatened under the Endangered Species Act (ESA) and the impacts are expected to be the same to EFH this action is expected to have ***No Adverse impact*** to chinook EFH. Due to the distance downstream of coho habitat and no potential of adverse impacts from this action ***No Adverse impact*** to coho EFH is

expected.

The potential adverse impacts or the beneficial effects are not anticipated to alter the long-term viability of fish species at the watershed or site scale in the Upper Tualatin watershed.

Wildlife Habitat Enhancement: The effects of the Wildlife Habitat enhancement projects are the same as those described in Alternative 2.

Cumulative Effects (Upper Tualatin Watershed): Cumulative effects would not differ substantially from what is described under the analysis for Alternative 2.

4.7 Conformance With Land Use Plans, Policies, and Programs

Alternative 1 (no action), Alternative 2 (the proposed action), and Alternative 3 unless otherwise noted, are in conformance with the following documents which provide the legal framework, standards, and guidelines for management of BLM lands in the Tillamook Resource Area:

* *Salem District Record of Decision and Resource Management Plan, May 1995*, pages 5-6 (ACS Objectives), 9-11 (Riparian Reserves), 22 (Air Quality), 22-24 (Water and Soil), 24-27 (Wildlife Habitat), 28-32 (Special Status Species and Habitat), 36 - 37 (Visual Resources), 41-45 (Recreation), 49-50 (Special Forest Products), 62-64 (Roads), 64-67 (Noxious Weeds and Fire/Fuels Management), and Appendix C1-C8 (Best Management Practices).

    - ACS Objectives and Riparian Reserves Objectives: All of the action alternatives are predicted to result in the maintenance and/or restoration of ACS objectives (Appendix 5). All of the alternatives would be expected to meet the Riparian Reserve objective to "provide habitat for special status, SEIS special attention and other terrestrial species." The action alternatives, which thin between 161 and 177 acres of Riparian Reserve, would result in a more diverse, wider array of habitat types within the Riparian Reserves as the treated portions respond to the thinning with increased windfirmness, growth and vigor. Design features of the action alternatives would help minimize the risk of adverse impacts to populations of concern.

    - AMA Objectives: Alternatives 2, and 3 would accelerate the development of some late-successional forest structural features, including large trees, gaps in the canopy, snags and down wood, various levels of overstory tree densities, and various levels of understory development, and would enhance the overall diversity of the area. Also, the action alternatives provide social and economic benefits to local communities through the supply of timber to local mills and contract work associated with the road decomissioning projects. Alternative 1 appears not to be in conformance because it does not contain a provision for the supply of timber or contract work that would contribute to the local economy. Five AMA learning

objectives have been identified and will be monitored by appropriate Resource Specialists.

- Air Quality Objectives: Any prescribed burning or burning of slash at roads and landings would adhere to smoke management/air quality standards.

- Water and Soils Objectives: Applicable Best Management Practices as described in the RMP, (Appendix C1-C10) are incorporated into the project design for the action alternatives and assure the maintenance of water quality and reduce the impacts to soil productivity while meeting other resource management objectives.

S Wildlife Habitat Objectives: Project design features for the density management proposals in both Alternatives 2 and 3 assure consistency with wildlife habitat objectives. These design features include but are not limited to providing snag, green tree and down wood habitat features as well as requirements to protect existing CWD and reserving all merchantable-sized hardwoods. Both alternatives have separate wildlife habitat enhancement projects that would treat between 192 and 206 acres for the specific needs of wildlife.

- Special Status and SEIS Special Attention Species and Habitat Objectives:

  All of the alternatives are predicted not to contribute to the need to list or elevate their status to a higher level of concern (Chapter 4.4 and 4.5 and Appendix 7 and 8).

- Visual Resources Objectives: All of the alternatives are consistent with the visual resources management objectives.

- Noxious Weeds: All of the alternatives are predicted to avoid the introduction and spread of noxious weeds however they would likely result in an increase in the number and possibly diversity of weed species in the project area with these species returning to their low level as the native vegetation returns (see Appendix 8).

- Alternatives 2 and 3 contain design features to avoid the introduction and spread of noxious weeds (Chapter 2).

- Fire/Fuels Management: Alternatives 2 and 3 contain fuel management activities that would be conducted in such a manner as to adhere to smoke management/air quality standards (Project Record, 55) and meet ACS objectives.

- Best Management Practices: Alternatives 2 and 3 contain applicable Best Management Practices described in Appendix C1-C10 of the RMP.

* *Record of Decision for Amendments to Forest Service and Bureau of Land*

Management Planning Documents Within the Range of the Northern Spotted Owl (April, 1994).

- The RMP is consistent with the Record of Decision (*Salem District Resource Management Plan/Final Environmental Impact Statement, September, 1994*, Chapter 4-96). Since all of the action alternatives are consistent with the RMP, these alternatives are believed to be consistent with the Record of Decision.

* *Record of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl. (January, 2001)*

* Northern Coast Range Adaptive Management Area Guide, January 1997, pp. 7-14 and 49-50: Alternatives 2 and 3 accelerate the development of some late-successional forest structural features and provides social/economic benefit to local communities (Chapter 4).

* Late-Successional Reserve Assessment for Oregon's Northern Coast Range Adaptive Management Area, January 1998, pp. 44-52, 82-83, 86-87, 92-98: Alternatives 2 and 3 accelerate the development of some late-successional forest structural features; would enhance the overall level of diversity within the area; and would develop windfirmness (Chapter 4; Appendix 2)

* *Upper-Scoggins Tualatin Watershed Analysis*: The *Upper-Scoggins Tualatin Watershed Analysis* (Washington County Soil and Water Conservation District and USDI Bureau of Land Management, 2000), supports the proposed activities. Recommendations contained on pages 109 - 116 of the WA were considered in the development the Scoggins Creek Project.

* *Coastal Zone Management Act*, as amended: The project area is **not** located within Oregon's Coastal Zone boundary. However, the proposed action appears to be consistent with the applicable statewide planning goals identified in the Oregon Coastal Management Program.

* *Oregon Forest Practices Act*: All of the alternatives are consistent with the Oregon Forest Practices Act. Various project design features within the alternatives assure this compliance.

* *Endangered Species Act*: As per BLM State Office Instructional Memorandum No. OR-97-061, the applicable Reasonable and Prudent Measures/Conservation Recommendations contained with in the National Marine Fisheries Service March 18, 1997 Biological Opinion and Conference Opinion were incorporated into the design

features of Alternatives 2 and 3 (Chapter 2).

- No Section 7 Consultation with the National Marine Fisheries Service is required because the proposed project actions were determined to be a “no-effect” to Upper Willamette Steelhead, and Upper Willamette Chinook as well as their Critical Habitat. Additionally, the proposed projects were determined to have no adverse impact to essential fish habitat as determined by the Magnasum-Stevens Fishery Conservation and Management Act (2000).

- In accordance with regulations pursuant to Section 7 of the Endangered Species Act of 1973, as amended, formal consultation with the USFWS concerning the potential impacts of the Scoggins Creek project upon the spotted owl, marbled murrelet and bald eagle will be completed. This will most likely l be accomplished by including the Scoggins Creek project within the annual programmatic habitat modification biological assessment prepared by the interagency Level 1 Team (terrestrial subgroup) for the North Coast Province, rather than the preparation of a project site-specific Biological Assessment.

CHAPTER 5.0 ADAPTIVE MANAGEMENT AREA LEARNING OBJECTIVE AND MONITORING PLAN

Adaptive Management Areas are landscape units designated to encourage the development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives (*NWFP*, appendix D-1). The primary technical objective of the AMAs are development, demonstration, implementation, and evaluation of monitoring programs and innovative management practices that integrate ecological and economic values (*NWFP*, appendix D-3). In the spirit and guidance provided by this direction, the IDT working on this Environmental Assessment developed five opportunities for learning and innovation that are being incorporated into the proposed action (chapter 2, section 2.3.), and are being called "***AMA learning objectives***". All *AMA learning objectives* will be monitored by appropriate Resource Specialists and necessary information will be stored in the Tillamook Resource Area Monitoring database, by the Resource Area Monitoring coordinator.

AMA Learning Objective #1: Assessment of which of two techniques are most effective in releasing suppressed Pacific madrone to maintain it in the stand

Because the majority of the Pacific madrone occurs in T. 1S., R. 5W., section 15 (units 15-1 and 15-2), this section will be used to assess the effectiveness of different release methods on the subsequent growth and survival of madrone. Madrone occurs as a very minor component in the stands in section 15 and it is currently being suppressed by the dense overstory Douglas-fir canopy. It is desirable to maintain madrone in these stands to enhance diversity. Two methods of releasing madrone are proposed. The first method involves treating madrone as a leave tree in a manner similar to the other conifer leave trees, which will provide a more abrupt and greater degree of release. This method will be applied to five (all if less than five) madrone trees in the parcel in the northwest portion of section 15 (unit 15-1). The second method involves retaining madrone as a leave tree *in addition to the other conifer and hardwood leave trees*, which will provide a less abrupt and more gradual degree of release. This method will be applied to five (all if less than five) madrone trees in the parcel in the southeast portion of section 15 (unit 15-2). The location of all treated madrone trees will be determined by GPS and mapped. Trees will be assessed at intervals of five and 10 years after treatment for survival, growth, and vigor.

AMA Learning Objective #2: Determination if managing the overstory at low density and underplanting with a mixture of shade-tolerant conifers in one-acre irregularly shaped patches and leaving one-acre irregularly shaped patches untreated within the regular density management thinning matrix can develop a stand with characteristics thought to be desirable for marbled murrelets

The effectiveness of using scattered one-acre low-density patches with underplanting and one-acre untreated patches within the regular variable-density thinning matrix to enhance marbled murrelet

habitat will be assessed in the western block of T. 1S., R. 5W., Section 9 (unit 9-1). The centers of five well-distributed irregularly shaped low-density patches and two well-distributed irregularly shaped untreated patches will be located and their positions will be recorded using GPS and mapped. The low-density patches will be located outside of the Riparian Reserves in the area proposed for ground-based harvesting. The untreated patches will be located in the Riparian Reserves. Within the low-density patches, the density of the overstory trees will be reduced to about 25 trees per acre (60 square feet of basal area per acre) in a variable-spaced manner. Two of the trees in each low-density patch will be top-girdled to create snag-topped living trees and one tree will be felled and left for down wood. The low-density patches will also be planted with a mixture of shade-tolerant conifers (most likely grand fir and western red cedar). At intervals of five, 10, and 20 years after treatment, overstory trees in the all of the patches (low-density and untreated) will be examined for survival, growth, crown length, height/diameter ratio, and branch diameter class of the largest limbs. In addition, survival and growth of the understory trees will be monitored. Volume of coarse wood (snags and down wood) by decay class will also be assessed.

AMA Learning Objective #3: Determination if the density management thinning objectives can be accomplished in Douglas-fir stands containing dispersed *Phellinus weirii* infection centers by removing the symtomatic trees and retaining healthy-appearing susceptible conifers, less-susceptible conifers, and hardwoods.

The effectiveness of thinning Douglas-fir stands with dispersed *P. weirii* infection centers will be assessed in T. 1S., R. 5W., Section 5 (unit 5-1) because this section contains a relatively high level of *P. weirii* root rot. According to the forest survey, about 40% of the sample plots contained Douglas-fir trees infected with the disease. Prior to the start of thinning treatment in unit 5-1, the centers of five permanent 0.2-acre circular plots (52.7-foot radius) will be established and their positions will be recorded using GPS and mapped. As soon as is practical after thinning is completed, the overstory trees on the plot will be permanently numbered and marked for future data collection. At intervals of one, five, 10, and 20 years after treatment, overstory Douglas-fir (and grand fir if present) survival (including windthrow and subsequent mortality caused by Douglas-fir beetles) and growth on the plots will be assessed.

AMA Learning Objective #4: Determination of the effectiveness of treating disturbed sites with organic mulches and planted red alders.

The objective is to minimize surface erosion on highly disturbed sites, i.e. primary roads and landings, and to encourage their return to a more natural and productive condition as quickly as possible. Adding soil organic matter (mulches) into the soil will cover the exposed soil and should reduce erosion and restore long-term nutrient status or soil structure. The study would consist of two or three blocks of the three treatments and a control. The control would be seeded but would have no mulch or be planted with alder. A grass mix would be broadcast seeded by hand. Woody mulch would be spread across the disturbed surface. The mulch would consist of chipped logging debris found near the site. Most of the mulch would be chipped from needles and finer branches on or near the site. Large wood material would be avoided because they tend to have high C:N

(Carbon to Nitrogen) ratios. During decompaction; high C:N ratios can tie up large amounts of nitrogen needed for plant growth. Specifically the treatments will determine whether mulch treatment, a combination of mulch and alder treatment, or grass seeding is more effective in: minimizing surface erosion; shortening the time for vegetation to recover the site; reducing invasion by noxious weeds and exotic plants species; returning the site to a more natural and productive condition quickly; and remain cost effective. Photo points will be established and photo and field notes taken immediately before and after treatments, at 6 months, 1 year, and 3 years. An evaluation will be made after 3 years.

AMA Learning Objective #5: Comparison of stream surface shade and summer stream temperature pre-logging and post-logging along some stream reaches in the upper Sain Creek.

The learning objective would be to compare stream surface shade and summer stream temperature pre-logging and post-logging along some stream reaches in the upper Sain Creek. Thinning Riparian Reserves could potentially alter current shade levels and stream temperatures. Project design features such as no-cut buffers make any measurable changes in stream temperature unlikely, however this learning objective will allow us to quantify any changes that do occur. The "No-cut" buffers would be placed on all stream channels and would be 50-foot on non-fish bearing and 100-foot on fish bearing stream.

Temperature data loggers would be installed at sites with turbulence and mixing in the deepest part of the channel. They would be placed during the early summer and removed in the fall, for the two years prior and one year after final harvest. Canopy cover along portions of stream reaches would be determined by using a Solar Pathfinder. Canopy cover would be measured once prior to logging and once soon afterwards.

CHAPTER 6.0 LIST OF PREPARERS

The list of interdisciplinary team members that contributed to the preparation of the environmental assessment is contained in Table 11.

Table 10. List of preparers. This table contains a list of those individuals that prepared or contributed to the environmental analysis as documented in Environmental Assessment Number OR-086-02-01

Name	**Title**	**Resource**
Carolina Hooper	Forester	Project lead, writer/editor
Kurt Heckeroth	Forestry Technician	Botany
Walt Kastner	Forester	Silviculture
Steve Bahe	Wildlife Biologist	Wildlife
Cynthia Weston	Fisheries Biologist	Fish
Matt Walker	Fisheries Biologist	Fish
Dennis Worrel	Natural Resource Specialist	Soils and Water
Marc Pierce	Forester	Logging Systems
Bill Wais	Forester	Logging Systems
Carl Symons	Engineering Technician	Engineering
Bob McDonald	Natural Resource Specialist	GIS (Graphic Information System)
Katrina Symons	NEPA Coordinator	NEPA, cultural resources

CHAPTER 7.0 CONSULTATION AND PUBLIC INVOLVEMENT

No Section 7 Consultation with the National Marine Fisheries Service is required because the proposed project actions were determined to be a “no-effect” to Upper Willamette Steelhead, and Upper Willamette Chinook as well as their Critical Habitat. Additionally, the proposed projects were determined to have no adverse impact to essential fish habitat as determined by the Magnasum-Stevens Fishery Conservation and Management Act (2000). The wildlife habitat improvement project is included within the Upper Willamette River Steelhead and Chinook Programmatic Biological Assessment and Biological Opinion (Project Record, Document 56)

In accordance with regulations pursuant to Section 7 of the Endangered Species Act of 1973, as amended, formal consultation with the USFWS concerning the potential impacts of the Scoggins Creek project upon the spotted owl, marbled murrelet and bald eagle will be completed. This will most likely be accomplished by including the Scoggins Creek project within the annual programmatic habitat modification biological assessment prepared by the interagency Level 1 Team (terrestrial subgroup) for the North Coast Province, rather than the preparation of a project site-specific Biological Assessment.

Refer to section 1.6 for a discussion of the public involvement process used in the development of this environmental assessment.

Appendix 1 contains the public comments, and BLM responses to those comments, received during the 30-day public comment period for the proposed action.

Appendix 10 will contain the public comments, and BLM responses to those comments, received in response to the 30-day public comment period for this environmental assessment.